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Once upon a time, 35 years ago, they used to call us free divers. Now, if you don't use scuba, you're a snorkeler.

I am not a snorkeler.

I hate the word. I am a free diver, that's what I am. (That's what I like to be called, anyway.) I prefer not to use tanks — that's all. I like to go down on my own lungs, do my number, and come up when I need to breathe.

Twenty-four years ago I was certified by Mel Fisher, and dove with tanks before that — before NAUI was invented. But I still liked free diving. To go down to

your maximum depth, spear your fish, fight him to the surface, all on one lung full of air, that's what we did. The great lobsters, erupting in silence, with your hands on the base of their stalks 30 feet down in a cave, tasted better to us for the manner of their catching. I guess we were all heroes in our minds. There weren't even snorkels on the market when I started diving.

Sea bass, totuava, jewfish, grouper, blue sharks in the Catalina Channel, speared and landed by free divers. Guys
(Continued on Page 83)

FREE DIVER

A Trip Down
Nostalgia's Path

By John Steel



skin diver

Volume Twenty-Nine Number Nine

FOREIGN TRAVEL

- 8 THE CAYMAN WRECK CAPER** NANCY SEFTON
A derelict freighter becomes an undersea star

- 64 CORTEZ CRUISER** BONNIE J. CARDONE
A diver's odyssey aboard the *Marisla*

LOCAL DIVING

- 16 CALIFORNIA SEA LIONS** MARTY SNYDERMAN
Clowns of the Pacific Kelp

DIVE EQUIPMENT

- 19 THE FARA-FIN X** HOWARD HALL
A brand-new power fin

- 37 SNORKEL ROUNDUP** GERI MURPHY
A size and shape for your size and shape

- 60 IKELITE'S MINI C-LITE** GEORGE COZENS
A mini light with a major advantage

WRECK DIVING

- 20 TOP TEN WRECKS OF THE EAST COAST** ELLSWORTH BOYD
Rich in treasure or historical significance, they await discovery

PHOTOGRAPHY

- 24 GUIDE TO CLOSE-UP LENSES** JIM AND CATHY CHURCH
Gets you closer to the action

DIVE TECHNIQUES

- 28 PIPELINE PENETRATION** MICHAEL J. GANAS
A diver's firsthand account of a difficult mission

DIVER EDUCATION

- 31 SEA JEWELRY** ROBERT L. STRAIGHT
Gold or silver for the diver/collector

DIVE ADVENTURE

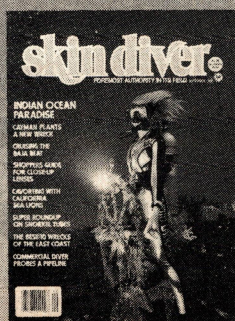
- 32 THE MALDIVE ISLANDS** HELMET DEBELIUS
Exciting frontier in the Indian Ocean

OPINION

- 2 FREE DIVER** JOHN STEEL
A trip down nostalgia's path

DEPARTMENTS

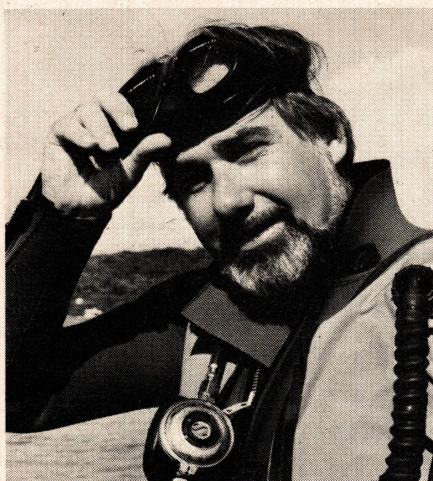
- | | | |
|----------------------------|-----------------------|-----------------------------|
| 10 DIVER'S CALENDAR | 49 TRAVEL PAGE | 72 FISH OF THE MONTH |
| 14 RX FOR DIVERS | 62 SCUBATECH | 84 DIVER'S DIRECTORY |
| | 69 SCUBA QUIZ | |



COVER

Herwarth Voigtmann transports a diver into hyperspace with a photo of his assistant Vreni, guiding her imaginary vessel through the fabulous underwater sights of the Maldives. (See page 32).

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QUIT SMOKING . . . OR DIVING?

Down deep, most smokers realize they shouldn't smoke, but they find it very difficult to quit. Many rationalize by thinking they can always quit if their smoking causes any medical problems. When you're young and healthy, lung cancer and heart disease seem to be a long way off. These are the diseases of old age, and maybe you'll quit smoking when you reach 40. Until then, maybe you can get by with a few more days, a few more weeks, or a few more years of smoking.

For the diver, however, there is no choice. He or she should quit smoking right now — or consider giving up diving. The hazards confronting a smoking diver are much more immediate and potentially more lethal. Mixing smoking with diving is just about as risky as drinking alcohol and flying a plane. Among the dangers which can be induced by smoking are such physiological problems as: involuntary hyperventilation, over-exhaustion, lung overpressure and maybe even air embolism. The scariest part of this is that it happens inside the body: You can't see it, you can't hear it, you can't feel it, and, you probably won't realize what's happening until it's too late.

Every diver who has ever gone through a basic scuba class knows what a tremendously important role the respiratory and circulatory systems of the body play in diving. The heart and the lungs are two of the most important organs in a diver's body and they are linked together with the rest of the muscles and tissues by the circulatory system. The blood which courses through your veins and arteries is the key mechanism for life, for this is the delivery vehicle for transporting that life-giving supply of oxygen to big muscles in the

SDM Editorial

BY THE PUBLISHER

legs, thighs and arms. Like microscopic boxcars, the hemoglobin in the blood stream picks up fresh oxygen at the lungs and distributes it to the hard-working muscles. On the return trip, it brings back carbon dioxide. A new scuba student devotes many pool and ocean training sessions to improving the physical fitness of his/her heart and lungs so that there is a more efficient delivery of oxygen-laden blood. A diver with a weak circulatory system is in trouble.

Smoking robs your body of much-needed, life-giving oxygen and thereby starves your muscles and tissues, causing severely reduced performance. Heavy smoking can cancel all the benefits which a person would normally receive from daily exercise, swimming practice, and physical fitness training. Research performed by respiratory physiologists indicates a smoker's circulatory functions are often decreased by 15 to 18 percent. It is this deprivation of oxygen which not only reduces the diver's strength and stamina, but can also lead to overexertion, involuntary hyperventilation, and possibly unconsciousness. A smoking diver is a setup for an underwater accident, for you have all the ingredients needed for a classic case of panic.


How does this happen? The culprit is a nasty character called carbon monoxide. The combustion or burning of an organic material, such as tobacco, produces carbon monoxide in surprising amounts. It is the same lethal gas found in automobile engine exhaust and can produce unconsciousness and death. Air pollution standards indicate it is dangerous to breathe air containing a carbon monoxide level higher than 100 parts per million, and air purity standards for scuba diving indicate that anything more than ten parts per million is dangerous. Yet, cigarette smoke can produce an incredibly high carbon monoxide level of 42,000 parts per million. Normal walking or sitting activities might not reveal any problems with this increased carbon monoxide uptake, but it could prove devastating while swimming at depth.

What does this carbon monoxide do to your body? It is a well-known medical fact that hemoglobin has a tremendously high affinity for carbon monoxide — 210 times greater than its attraction for

oxygen. Once the carbon monoxide has entered the lungs and passed through the walls of the alveoli, it bonds itself with the hemoglobin in the bloodstream, much like iron filings stuck to a strong magnet. Once hemoglobin is loaded with carbon monoxide, there is no place for the oxygen and the blood's capacity for carrying it becomes severely reduced. It takes more blood and a harder-pumping heart to overcome the effects of smoking. This condition generally goes unnoticed until the diver begins swimming hard at depth, thus causing his large leg and thigh muscles to work at peak capacity. Because of the reduced amount of oxygen flowing through the blood, the muscles tire quickly and the diver begins to huff and puff. He or she then nears panic as his/her lungs desperately try to force more oxygen through arteries which are loaded with carbon monoxide. Oxygen deprivation at depth can be one of the most serious problems facing a diver.

To complicate matters, we find that the effects of carbon monoxide absorption are surprisingly long lasting. It takes the body six hours to reduce the level of carbon monoxide by 50 percent, and traces of this contaminant can remain for 24 hours or more. If divers wanted to completely purge their bodies of carbon monoxide for a dive trip, they should not take a puff for at least two days prior to the event, and abstain from smoking until six hours after the dive, so that normal decompression functions can go unhampered.

If this were not enough to convince you to quit, let's consider still another serious hazard linked to smoking. Apparently the nicotine and tar substances in tobacco smoke are potent irritants to the respiratory tract and sensitive lung tissue. Heavy smokers often awaken with a morning cough and spit up sizable quantities of mucus. This should be an obvious clue. It has now been discovered that smokers often develop small airway obstructions following minor respiratory infections such as a common cold. These obstructions or plugged-up passageways can often last for more than a month after the outward symptoms of the cold have passed. Such obstructions within the fragile tissue of the lungs can pose a lethal hazard to the scuba diver during ascent from depth. Should the air passage become clogged with mucus or collapse from pressure buildup, an air embolism could easily result.

Considering the volume of evidence presented by medical researchers, it would appear that divers have little choice in the matter. If a person wishes to pursue the sport of diving, he or she should consider giving up smoking immediately. 

a good condition for every situation



Let's face it, diving is a sport that takes place under a great variety of situations. There is no single wet suit to cover every possible dive situation. Choosing a wet suit that will prove satisfactory under the greatest variety of conditions isn't easy - there are a lot of wet suits out there to choose from. ☐ But there is a wet suit manufacturer who makes a wet suit for every dive situation and that's Sea Suits. Sea Suits makes a full line of dive suits. A dive suit for every condition plus one more. That extra condition is quality. Sea Suits emphasizes quality because quality is the one condition that covers every condition. Nothing serves as well as having the best. ☐ If you want the best no matter what the situation choose a Sea Suits. We know quality satisfies... it always has and no matter what the conditions it always will.



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Film Festivals 'n Symposiums

PHOTO COMPETITION

The Los Angeles Chapter of the Underwater Photographic Society will sponsor the 18th International Photographic Competition and Film Festival, Saturday, October 25, at 8 pm, Orange Coast College, Costa Mesa, CA. The winning slides and movies will be shown, as well as several other underwater films.

The film festival is part of a two day program, the Southern California Conference on Underwater Education, held October 25-26, at Orange Coast College. The program includes workshops, lectures, socials, seminars, exhibits, and demonstrations. For ticket information write: SoC-Q, Susan Bangasser, 12724 Valley View Lane, Redlands, CA 92373.

Tickets for the film festival are \$5. For tickets to the film show, write: Eric Hanauer, Dept. Physical Education, Cal. State University Fullerton, Fullerton, CA 92534. 🐠

SUBAQUA FILM FESTIVAL

The British Society of Underwater Photographers and the British Sub Aqua Club will jointly sponsor an U/W Film Festival in London, October 29-30. The festival will be hosted by Stan Waterman who will show not only his own films, but those of Jack McKenney, Robin Lehman, Al Giddings and Ron Taylor. The site will be the British Commonwealth Institute on Kensington High Street, London W8, and tickets are available by mail at the rate of £3.50 each evening (different program each night) by sending a stamped addressed envelope to: BSOU Film Festival, 6 Gwynne Road, London SW11. 🐠

SEAMARK '80

A thousand guests will visit the New England Aquarium, Boston, November 1. They'll come to hear the New Black Eagle Jazz Band, to dance, to enjoy the marine exhibits, to sample the hors d'oeuvres. They'll talk with divers underwater, applaud the seals and laugh with the dolphins, and have a good time.

The event is Seamark '80, a fund-raiser for the Cotting School for Handicapped Children. For serious divers, there are films and lectures by notables in the field.

For more information about Seamark or the Cotting School, please write Seamark, Cotting School for Handicapped Children, 241 St. Botolph St., Boston, MA 02115. 🐠

JOHN STONEMAN AT ROCKFORD

Canadian filmmaker John Stoneman will be the host of the 4th annual U/W film symposium held in Rockford, Illinois, October 24th. Stoneman, who owns and operates Mako Films, Ltd., has made over 40 U/W films and has won many international awards for those films. Films to be shown include *Sentinel of the Sea* and *Sea Nymph*. The two hour show will start at 8 pm.

Saturday, amid displays of photo work, antique bottles, wreck artifacts, and seashells, divers will be treated to another film. Saturday evening will feature the 11th annual awards banquet of the Rockford Divers Association and another film from Stoneman. All events will take place at the South Beloit Holiday Inn. Friday evening tickets are \$4, and Saturday evening banquet tickets are \$11. Write: Bill Steinborn, 1385 Randall Drive, Rockford, IL 61108. 🐠

SAN DIEGO U/W FILM FESTIVAL

San Diego's 16th annual Underwater Film Festival will once again be held at the newly renovated Civic Theater, San Diego, CA, September 12-13. Films featured on this year's two day program will span the exotic dive spots of the world, and will include: *From the Log of Just Love*, by Ernie Brooks; *The Underwater World of Florida*, by Jack McKenney; *Diver's Log*, by Ozzie Wissell; *One Man's Dream*, by Ron Coley; and, of course, films on sharks and eels.

Peter Gimble (producer of *Blue Water, White Death*), will present his film on the *Mystery of the Andrea Doria*; and master of ceremonies, Dick Anderson, will show his *River Gold* and *Gold From the Winfield Scott*.

Tickets are available at all local dive shops, the Civic Theater Box Office, and Select-a-seat outlets. Seating is open, dress casual, and tickets, for each evening, \$6. 🐠

DEMA SHOW

The 1981 DEMA Trade Show will be held at the Las Vegas Hilton, January 17-20, 1981. Featuring the world's largest display of scuba products and related services, the DEMA Trade Show is a must event for every dive equipment retailer. Attendees will have the opportunity to view a myriad of new products, attend seminars and repair clinics, meet the manufacturers, talk to travel/tour operators, renew old acquaintances and make new ones.

Since its inception, the DEMA Trade Show has doubled in size every two years. Over 70,000 square feet of exhibit space has been allocated for this event and another sellout is expected this year. Contact: Bob Gray, DEMA, P.O. Box 217, Tustin, CA 92680. 🐠

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Cayman Caper

A large, vertical underwater photograph of a shipwreck, likely the RMS Queen Mary, dominates the background. The ship's hull is visible, showing rivets and structural details, and is partially covered in coral and marine life. The water is a deep, clear blue. In the foreground, there is a close-up of a coral reef with various types of coral, including branching and brain coral, and some small fish swimming nearby.

Derelict Freighter Transformed
To Undersea Star

Text and Photography
by Nancy Sefton

A float, she was a decrepit war veteran turned vagabond whom nobody wanted. Today, lying in 50 feet of water off the west shore of Grand Cayman, she is a celebrity, visited by fans every day, photographed and immortalized.

Such is a capsule history of the *Oro Verde*, a 180 foot freighter, and sister ship of the ill-fated *U.S.S. Pueblo*. A long and varied career led the *Verde* to the Cayman Islands, where she has recently been scuttled. Carefully placed on a sandy bottom and surrounded by coral ridges, she lies intact about one-quarter mile off the island's Seven Mile Beach, easily accessible to the majority of dive operators.

During World War II the *Oro Verde* served as a cargo ship for the Allies, her three stout gun turrets testifying to her war-worthiness. Later she carried freight across the Caribbean, fully outfitted for refrigerated cargo. In her final days, her owners were unable to meet their financial obligations and they neglected to pay the salaries of her Caribbean crewmen. Disgruntled, they drove her full throttle into Grand Cayman's North Sound, where she ran aground in the southern shallows. And there she sat for many months; high, dry and friendless.

But soon Cayman's dive operators

began to see her as a potential new dive attraction. Grand Cayman's famous *Balboa*, long a popular shipwreck and perhaps the world's most photographed one, has its growing disadvantages as a dive area. Her location in George Town's busy harbor has placed her in the midst of ever-increasing commercial traffic, including some half dozen cruise ships which call on a weekly basis at the small port. Dive operators knew that it would not be long before the *Balboa* became a tricky site to visit, and a new wreck was needed to take her place.

In 1979 the Cayman Government put the *Oro Verde* up for sale. The successful group of bidders included Cayman's Bob Soto, pioneer of that country's dive industry. Preparations for the sinking of the *Verde* began last spring, when volunteers started cleaning her up while she was still aground in North Sound. Hatches were removed, and all potential dive hazards removed.

The next task was to haul her off the sand; four boats couldn't budge her. So Soto waited for the season's highest tide, some eight inches above normal, and pulled her free with only one vessel, his own *Sea Hunter*. Tied up at the George Town dock, the *Verde* underwent more cleaning by eager volunteers who

stripped out the vast amount of fiberglass insulation and the wooden partitions still intact from her food-hauling days.

Finally, on the morning of May 31, 1980, she was ready for her christening ceremony. A flotilla of over 30 boats accompanied her as she was towed north along Seven Mile Beach to her final resting place. Once she was anchored in the right spot, divers cut a small hole at the water line, and the seacocks were opened. At first, she listed to starboard as she settled. Then, unexpectedly, she righted herself, as if reluctant to fulfill her destiny on the sea bottom. By this time she was low enough for water to pour into the open hatchways. At last the sea began washing over her decks as she

(Continued on Page 59)

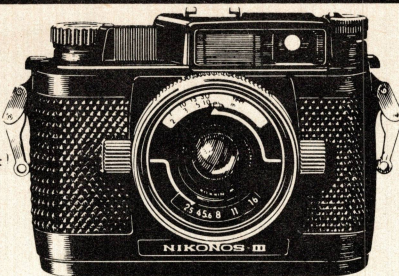


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Diver's Calendar

August 30-September 1 Montana Divers Festival, Yellow Bay Biological Station, Flathead Lake, Montana (Contact: Jim Chester, 423 N. 16th Ave., Bozeman, MT 59715)

September 12-13 San Diego U/W Film Festival, Civic Theater, San Diego, CA (Contact: Zona Wahrenbrock, San Diego U/W Film Festival, 2439 Romney Road, San Diego, CA)

September 20 Vision 360 International Diving Symposium & Film Festival, Buffalo State College (Contact: Dallas Edmiston, PO Box 842, Buffalo, NY 14221)

September 20 Vision 360 U/W Photo Competition (Contact: Ron Smith, PO Box 842, Buffalo, NY 14221)

September 20-21 Law Enforcement Diving Seminar, Bryan, Ohio (Contact: Deputy Duane Everhart, Williams County Sheriff Dept., 218 W. Bryan St., Bryan, OH 43506)

September 27 NAUI U/W Film Review, John Hancock Hall, Boston, MA, 8 pm (Contact: Fred Calhoun, PO Box 291, Back Bay Annex, Boston, MA 02117)

October 5 Diver's Flea Market, Southampton College, Southampton, Long Island, NY (Contact: Adam Cohen, Box 463S, Southampton College, Southampton, NY 11968)

October 24-25 Dive to Adventure with John Stoneman, Rockford Divers Association, South Beloit/Holiday Inn, 8 p.m. (Contact: Bill Steinborn, 1385 Randall Dr., Rockford, IL 61108)

October 25-26 Southern California Conference on U/W Education, Orange Coast College, Costa Mesa, CA (Contact: Soc-O, Susan Bangasser, 12724 Valley View Lane, Redlands, CA 92373)

October 29-30 British Subaqua and British Society of U/W Photographer's Film Festival, British Commonwealth Institute, London, England (Contact: BSOUP Film Festival, 6 Gwynne Rd., London SW11)

November 1 Seamark '80, New England Aquarium, Boston, MA (Contact: Seamark, Coting School for Handicapped Children, 241 St. Botolph St., Boston, MA 02115)

November 15 Hawkeye Scuba Club exhibit, banquet, Central YMCA, Cedar Rapids, IA (Contact: Hawkeye Scuba Club, PO Box 8042, Cedar Rapids, IA 52408)

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New from PRINCETON TECTONICS, the BL-1000 BOTTOM LIGHT is a compact, rugged and dependable light source for divers. Featuring a unique locking slide switch which does not penetrate the case, BOTTOM LIGHT incorporates several engineering innovations that make it the best buy in small diving lights today.

BOTTOM LIGHT FEATURES:

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Outer Case - High impact Lexan®; pressure tested to 300 feet.

Bulb - High intensity PR 13 lantern bulb.

Battery - 4 standard replaceable alkaline C-cells or rechargeable standard C-cells. (Batteries not supplied.)

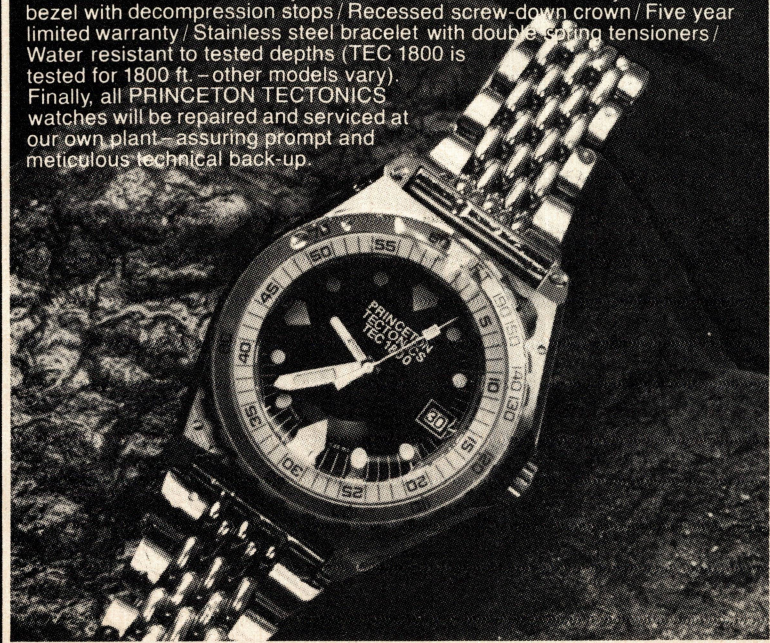
Use Time - 5 hours continuous burn; 10 hours intermittent.

Price - BOTTOM LIGHT is priced so competitively you'll have to visit your dive shop to believe it.



NEW PRINCETON TECTONICS WATCHES

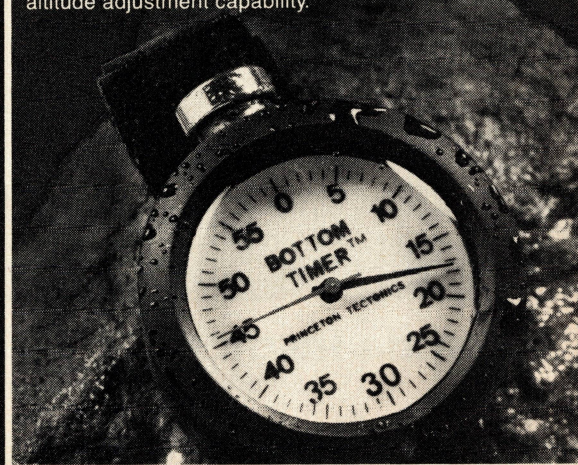
The new PRINCETON TECTONICS watches have been designed with an eye to use, reliability and looks. Pictured here is the TEC 1800 which shares the following features with all the new Princeton Tectonics watches: Scratch resistant mineral crystal / Quartz movement / One-way ratchet-bezel with decompression stops / Recessed screw-down crown / Five year limited warranty / Stainless steel bracelet with double spring tensioners / Water resistant to tested depths (TEC 1800 is tested for 1800 ft. - other models vary). Finally, all PRINCETON TECTONICS watches will be repaired and serviced at our own plant - assuring prompt and meticulous technical back-up.



BOTTOM TIMER®

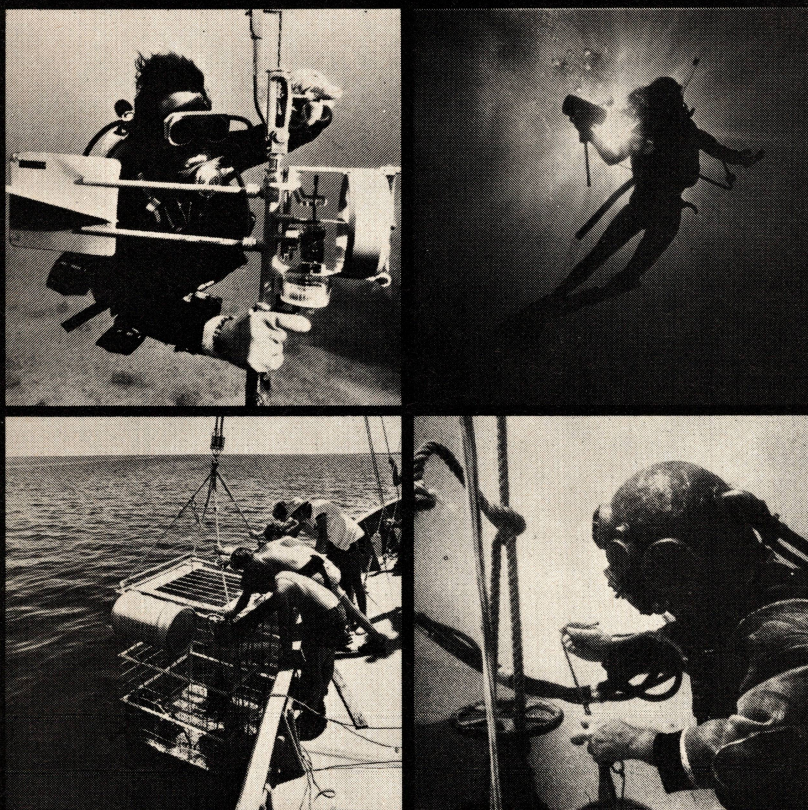
The BT 400 Bottom Timer

Bottom Timer, from Princeton Tectonics, is the first and only fully automatic underwater stopwatch and the BT 400 is the Bottom Timer for the serious diver. For the diver who demands the maximum from his gear because he does more diving, more often, more places. The BT 400 features an all luminous dial with contrasting black numbers, a red full-sweep second hand and altitude adjustment capability.



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The shark cage above is self-contained, buoyancy-controlled, and surface-communicating. You might have read about it elsewhere. We could have assigned the design and construction to our faculty. We didn't. Two of our students conceived, constructed, and tested the cage as a part of their regular academic program.

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SHARK TAGGING

SKIN DIVER's Editor/Publisher, Paul Tzimoulis, served as co-host and competition judge for the 2nd Annual, CBS-TV Sports Spectacular's shark tagging



competition. The event, held June 21-22, was staged in a deep water channel 50 miles off the coast, between San Clemente Island and San Diego, CA.

Entrants — Jack McKenney and Chuck Nicklin, of the U.S.; Ron and Valerie Taylor, representing Australia; and Helmut Debelius and Herwarth Voigtmann, of West Germany — attempted to tag as many sharks as possible within a ten minute time limit.

The winners of the event, the American team, were awarded \$2,000. They tagged 21 blue sharks. Competition headquarters were located aboard the *Sand Dollar* and *Bottom Scratcher*, dive charter boats owned by Bill Johnston of San Diego. An article detailing the event will appear in October's SKIN DIVER. 🦈

WRECK CHARTS

The Wreck Chart Company, publishers of once secret U.S. Government charts showing the positions of over 500 ships sunk off the U.S. Coast during World War II, is now providing precise Loran C fixes for all wrecks.

Using an advanced Loran computer program written by Robert Dougherty, one of the developers of Loran C at the U.S. Bureau of Standards, and now a Loran research consultant with the Colorado Research Prediction Laboratory, the Lat/Long fixes have been converted to Loran C.

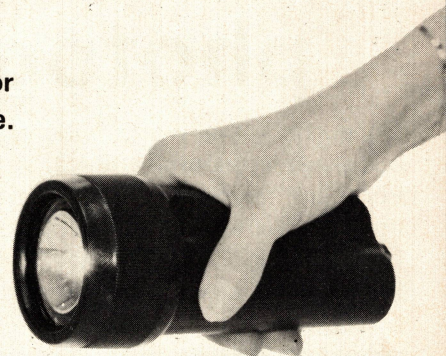
The charts sell for \$11 each from Wreck Charts, 1651 Huron Trail, Maitland, FL 32751. The Loran numbers for both the wrecks and the sea buoys for the area are included in this price. Wreck Charts also offers the sea buoy fixes for Northern waters (Maine to Cape Hatteras) and Southern Waters (Cape Hatteras to Key West and the Gulf), without the charts, for \$11 per list. 🦈

IKELITES

We have been asked if there is a diver or diving situation for which we do not make a light. Frankly, we cannot think of one. Our commitment to being the leader in underwater lighting requires our making available the widest possible range of underwater lights. We know that the diver will be able to find an IKELITE that best suits his or her individual needs. Our commitment in underwater lighting has led us to innovative designs such as our NEW MINI C-LITE, a small light with twice the intensity and coverage of similar size lights; our IKELITE II with its innovative on/off control, a light which has been the standard of the diving industry over the years; and

our C-LITE series with its unique shape and compact size which is offered in two models. One is non-rechargeable and the second, a rechargeable model, is unquestionably one of the brightest diving lights in the industry. The MODULAR LITE series utilizes one light body for four lights. This one body accepts all interchangeable battery pack/bulb combinations; thus the simplest of MODULAR LITES can grow with your needs to the world's brightest diving light, the MODULAR SUPERLITE, or a MODULAR MOVIE LITE.

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**TODAY'S LEADER IN
DIVER EDUCATION**

R_x For Divers

BY CHARLES V. BROWN, M.D.

EARS AGAIN

No other organ, regardless of size, plagues so many divers so mightily. Two more readers tell us about their ear troubles. For the first, ear problems threaten to cancel a diving debut, and for the second, to scuttle a career.

Question: Syd Monteith of Ontario, Canada is in the pink of health and wants to become a diver. As a lad he had to have his eardrums pierced because his eustachian tubes didn't function well, and every time he caught a head cold he developed a middle ear infection. It's not that bad anymore, but he still has trouble equalizing underwater. He's seen a lightweight helmet pictured in *SKIN DIVER* and wonders whether such head gear would solve his problem.

Answer: Sorry, but no. A helmet merely substitutes air for water about the face and head. It keeps the outer ear dry but can't help equalize the pressure in the middle ear. Talk to some dive instructors about ear clearing aids, and have an ENT specialist check to see whether you have a correctable disorder.

Question: Robert Rigillo of Rehoboth, Massachusetts has been diving for six years with nary a problem. Then he enrolled in a commercial dive school in Florida and his woes began. Upon surfacing from a 30 foot dive he lost his equilibrium, staggered ashore, and vomited. Nausea persisted for several days. After that he dived with Kirby-Morgan band masks, a Carson hat, Mark V gear, etc., without a hitch. Then a ditch and don in 30 feet of water resulted in a replay of the vertigo episode, only worse. He was laid up in bed and couldn't walk for three days.

Looking back, Robert feels that he'd equalized properly. He concludes that his eardrum must have ruptured on the first occasion and, incompletely healed, ruptured again on the second. He hasn't dived since, but has made a 200 foot chamber drop with some difficulty in ear clearing. He wants to know whether his eardrum will heal well enough to permit resuming his chosen career.

Answer: I doubt that your eardrum ruptured. While a rupture that lets water into the middle ear will cause vertigo, it'll be brief — it won't linger like yours did. Furthermore, the first doc to aim an otoscope up your ear canal would have spotted the rupture and told you about it.

What did make you dizzy? The dive profiles rule out inner ear bends, and you've admitted difficulty equalizing in the chamber, so your problem has to be eustachian tube insufficiency. That makes you a candidate for alternobaric vertigo (unequal pressure in the right and left middle ears), but it too would be

transient. I believe that you suffer inner ear damage secondary to squeeze or to the clearing maneuver you used. Rupture of the round or oval window (between the middle and inner ear) may have been involved. Don't dive again unless an ear specialist is able to correct the basic problem and assure you there'll be no recurrence.

Question: Tim Burnow of Sacramento, California was practicing his dive skills in a pool. While doing a bail-out (jumping in with all essential gear in hand and donning it underwater), he experienced pain in the sinus area. It soon stopped, but later in the day recurred and wouldn't quit. He wonders about infection.

Answer: You probably had a sinus squeeze, which implies that a sinus opening was blocked by swollen membranes. The block persisted after the dive, and absorption of sinus air into the blood stream produced a relative vacuum just like the squeeze had done, with the same pain. When blockage is not relieved, the vacuum is eventually overcome by further swelling of the lining membrane, leakage of fluid from it, and accumulation of mucus. Then, if the mucus can't drain out, a positive pressure replaces the vacuum and trapped bacteria multiply, producing sinus infection.

The first step in treatment is taking a decongestant to shrink the membranes and re-establish drainage. If this doesn't suffice, antibiotics and, occasionally, surgical drainage may be required.

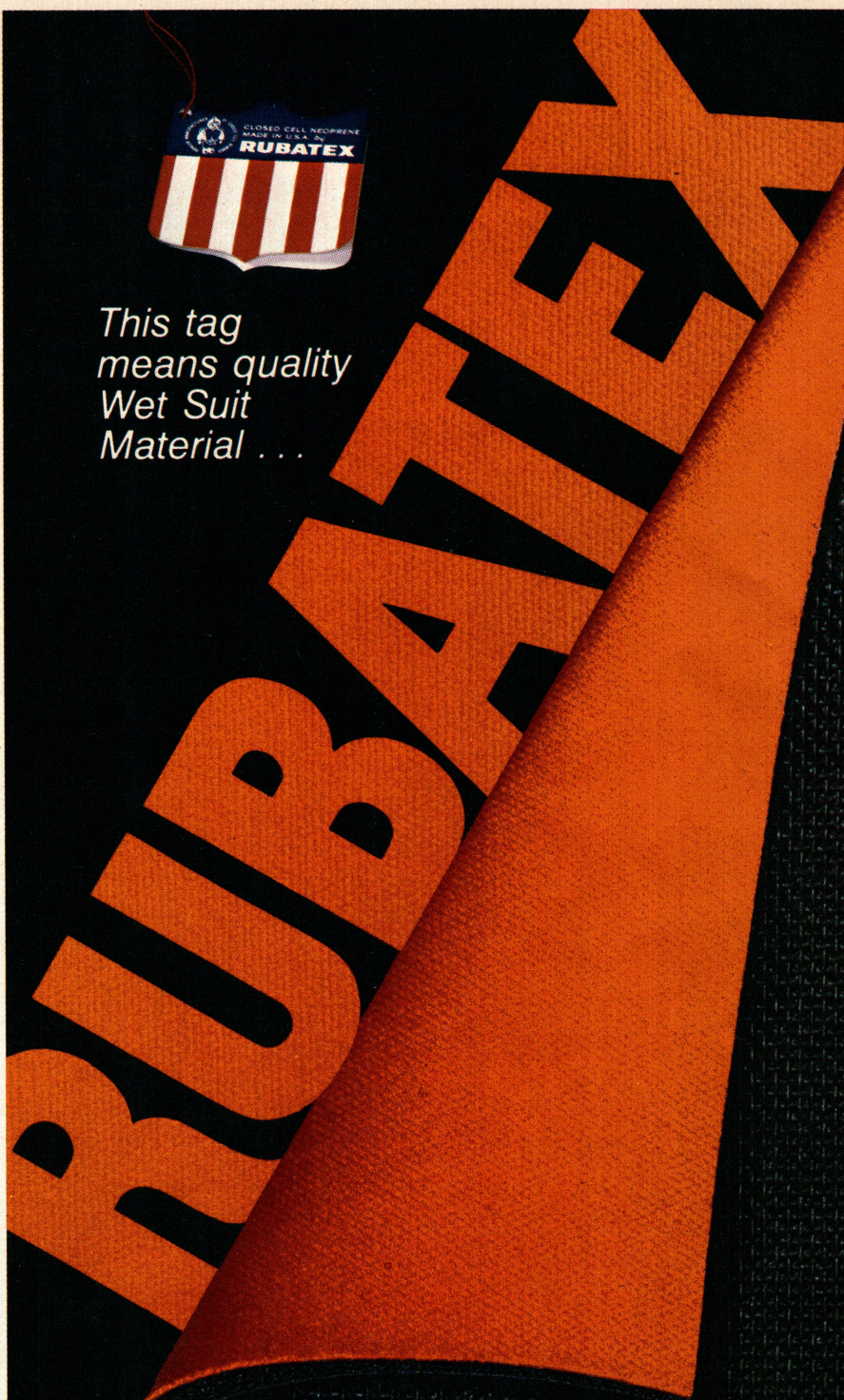
Question: YMCA scuba instructor Harold Elwyn of Bethesda, Maryland will tell you that any physical sport can be dangerous. He should know — he broke his neck. He did it skiing, not diving. Now, of course, the question is whether he can safely resume diving.

What broke was the odontoid process of the second cervical vertebra. The odontoid process is a tooth-like projection that sticks up into a ring in the first cervical vertebra, forming the pivot that allows the head to rotate freely. The fix, which utilized a bone graft taken from the hip, was said to be 100 percent successful. Harold has his doctor's permission to resume all dangerous activities. That's easy for the doctor to say. But is it really good for Harold? Might the injury predispose him to spinal bends?

Answer: The observation that previously injured areas seem more susceptible to bends was made in connection with limb bends, where the bubbles are probably within a tendon or other connective tissue. An odontoid hit has never been described, and it's not known whether spinal cord injuries predispose one to spinal hits. Your letter made no mention of injury to your spinal cord. If there was none, there's no reason to suspect such predisposition. Anyway, spinal hits usually occur at a lower level than the second cervical vertebra. We agree with your doctor. >



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California Sea Lions

cavorting clowns
of the Pacific kelp

Text and Photography
by Marty Snyderman



Sometimes, I am absolutely certain that they are all around me in the water, but I never catch the slightest glimpse. I can see them on the beach, watch them enter the water, and then they vanish as if trying to avoid me. Other times they seem to come out of nowhere, darting and dashing full speed ahead. Suddenly, they are right in my face, veering off to avoid a collision at the last possible instant; only to disappear into

the distance with the same suddenness with which they appeared.

Sometimes they provide us with entertainment rarely equaled in the marine environment. During those dives, they never leave. They might pause upside down in front of you staring into your mask, or simply swim circles around you, or perhaps blow bubbles at you. Occasionally they will even allow you to touch them in a game of

chase. In such a game, they are clearly in control — and you are clearly it — the chaser, until they allow themselves to be tagged. Without a doubt, their superior grace, speed, and coordination clearly illustrate that they are better designed for the sea than divers. We are fortunate to be watching them perform their underwater choreography; shows produced by the best there is — Mother Nature.

They are California sea lions, *Zalophus californianus*. And they are just that, sea lions — not seals — as they are often called. The star performers in the so-called seal shows are usually sea lions, not seals. Although sea lions and seals may look alike, biologically speaking, sea lions are more closely related to bears than seals.

Both in and out of the water, California sea lions are often observed to mix closely with



Sea Lions

other pinnipeds — such as elephant seals and harbor seals. Generally, sea lions can be distinguished from other pinnipeds by their external ears, and because sea lions get their propulsion from their foreflippers, and use their rear flippers as rudders, while seals propel themselves with their hindflippers. To clear up a point of potential confusion, it is worthwhile to note that sea lions are correctly referred to as eared seals. California sea lions can also be distinguished from other sea lions by their habitat. Ranging as far north as the Bering Sea and as far south as the Galapagos Islands, there are three separate populations of sea lions: Commonly called the California, the Galapagos, and the Japanese groups.

Sea lion bulls weigh as much as 700 pounds and attain lengths of better than ten feet. Males are generally much larger than females and have a noticeably larger head and are a much darker brown. Fully grown females weigh up to 250 pounds and attain lengths of eight feet.

Throughout the year, whether during their breeding season or not, sea lions are rather gregarious, preferring to gather together in groups. The gregarious nature is especially true of females and pups, and can be verified simply by the fact that during the non-breeding season of August through April, herds of sea lions huddle closely together on land when they haul out of the water. Biologists do, however, tell us that their social structure during these months is much more loosely organized than during the mating season. This gregarious nature has two advantages for divers: It is fun to watch sea lions swim together, and whenever you see one sea lion, there is a good chance of seeing several.

When seen on land — where they haul out during the non-breeding season or at the rookeries during mating season — sea lions appear rather awkward. They are, however, much more mobile on land than are many pinnipeds. One should pay heed to this, especially in the case of bulls at a rookery. On the rocky and often slippery terrain of the California Channel Islands and on the shores of Baja, bulls can often move faster than humans for a short distance. Just by keeping your size and their size in mind, nothing more need be said.

In the water the design and movement of sea lions is most astonishing. Here sea lions display a form and proficiency that is the envy of most divers. Supremely skilled as swimmers and body surfers, they appear to be perfectly designed for the aquatic environment. Whether pursuing fish or squid, turning sharply to avoid your touch, or surfing in waves that are much too big for humans to safely enter,

sea lions always look to be in control.

During the mating season (approximately May through July) the social behavior of these mammals changes considerably. Sea lions are polygamous, meaning that both sexual partners have more than one mate. Breeding males become strongly territorial and vigorously defend their realms. Confrontations between competing males can be rather intense; the fights involve a lot of chest-to-chest pushing and biting. The idea of the fights is to physically push the competitor out of the territory. Often, serious scars can be seen on the chests of adult males.

While the ratio of females to bulls in any one area might be as high as 14 to 1, it is interesting to note that bulls compete only for physical territory, and make no effort to prevent females from breeding with bulls in other areas. Copulation occurs both on land and in the water, and the female will bear young during the next breeding season, even though the gestation period is only nine months. This is due to a phenomena called delayed implantation, where the fertilized egg remains dormant in the uterine wall for three months, enabling females to bear young at the rookeries where they breed.

When entering a rookery to bear young, pregnant females tend to band together. Females can be quite aggressive in defense of themselves and their young, just before and after giving birth. Mothers and pups quickly develop a strong relationship and the ability to identify each other. During the first few weeks of a pup's life, mothers rarely, if ever, leave their pup's side — even when entering the water to escape the heat. Mothers help their offspring learn to swim by a modified sink-or-swim method. The mother drags a somewhat less than anxious pup into the water and then supports and pushes the pup through the awkward stages in a helpful manner. Although the first few minutes appear a little frantic for the pups, they quickly take to water and can often be seen nipping at each other or playing tag in the water.


On land, sea lions can be easily approached if you stay downwind, move slowly and keep a low profile. This does not necessarily mean that sea lions are comfortable with humans, but more likely indicates that their senses on land do not allow for ready detection of people. If startled by sudden movements or by an approach from above, entire herds sometimes stampede. During such a stampede sea lions tend to dash boldly for the water and at times suffer serious injuries or fatal falls in their haste.

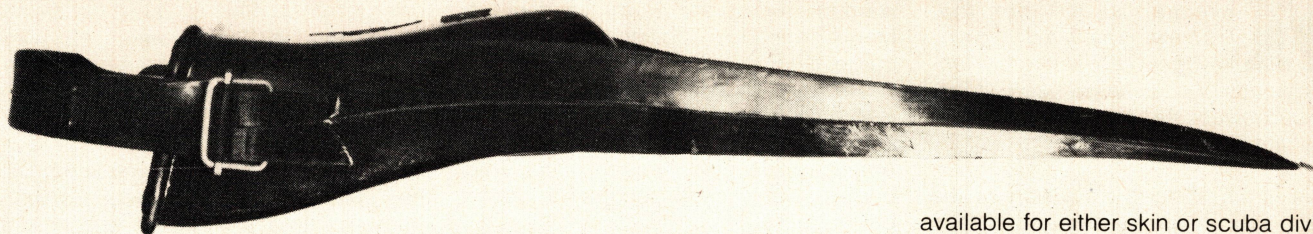
In the water, pups are often most curious about divers and appear to be playful; occasionally nipping at divers or their equipment. It is all in good fun, of course, but it can be a bit unnerving. Females and non-breeding males are also curious and playful, but bulls tend to keep their distance — approach-

ing just close enough to check out the situation. At times, bulls have been known to rush toward divers and blow bubbles in what many experts profess to be a threatening display. During the mating season and when bearing young, playfulness can quickly turn into aggression with adults of both sexes, although overt aggression causing injury to divers is not well documented. Once, however, while filming sharks off the coast of Southern California, my buddy and I watched a sea lion bite a mako shark on four different occasions, chasing the shark away from our cameras. Having witnessed that incident, I have no doubt that sea lions can stand up for themselves when the need arises.

Of course, if you are diving with a game bag full of abalone, or fish, the entire game changes. Sea lions like to eat too, and they have been known to have rather poor manners in regard to a diver's catch.

Marine biologists often seem to struggle with the idea of whether or not non-human species can play. Ric Matthews, the distinguished biologist who helped me gather information for this article, believes that sea lions play both with each other and with divers. Once I watched a good friend compete with a sea lion pup for a piece of kelp. First, Larry had the kelp and the sea lion took it away. Then the sea lion placed the kelp on the sandy bottom about eight feet in front of Larry. The animal then bolted away to the surface some 40 feet away and returned to grab the kelp before Larry could — although I must admit Larry traveled nearly four feet toward the prize. Then, with the kelp in its mouth, the sea lion proceeded to swim tight circles around Larry, rushing in and out as Larry grabbed handful after handful of sea water as he tried in vain to touch the kelp. Clearly victorious, the sea lion swam up to Larry and dropped the kelp. Larry picked it up and turned, trying proudly to claim victory, when suddenly, the pup returned, grabbed the kelp and disappeared for good. Totally exasperated, Larry returned to the boat to be booed and jeered by the large group who had watched the entire show.

The fun of California sea lions is not in just reading a book or writing an article about them, but watching them perform in the wild. The setting for such a performance might be the Galapagos Islands, Mexico's Sea of Cortez, or Seal Cove, San Clemente Island. If at Seal Cove, the setting might look something like this: There is not a cloud in the sky, the sunlight is flickering as it filters through the kelp, the eel grass is swaying in the surge, the water is warm and clear, and the stars of the show enter, the sea lions. Sound like fun? Well, whatever the setting, you can rest assured that the show in the wild is worth the price of admission. The actors are made for their roles. 



THE FARA-FIN X

Text and photography
by Howard Hall



Last March, SKIN DIVER published a comprehensive article dealing with dive fins. Since I authored this article and since in the process of writing it I had water tested nearly every fin on the market, SKIN DIVER called me when they decided to do a product report on Farallon/Oceanic's new Fara-Fin X.

During the research and testing for the March dive fin roundup, I had decided that fins fell into three broad categories: those that I would hate to be caught one-half mile off the beach wearing, those that seemed perfectly adequate if unremarkable, and finally those that seemed to work as an extension of your foot and were an absolute

pleasure to dive with. It would have been rather fun to include this categorization in that article, but it wouldn't have been very meaningful. Fred Fischer, who helped me test the fins, often disagreed with my evaluation. Fins that I nearly drowned with while trying to cross a pool, Fred often liked. It became obvious that our individual opinions were too subjective to be included in the article. We did, however, agree on the factors that made a fin excellent and after testing the Fara-Fin X, I can say that its design includes all of those factors and that, at least in my opinion, the Fara-Fin X belongs in that top category.

I found it to be one of the very best fins

available for either skin or scuba diving.

There are several important considerations that are necessary when choosing a dive fin. For my body size and the kind of diving I do, the Fara-Fin X is superior. The vent design is the front-to-back, flow-through design. This reduces water resistance on the dead area of the blade and reduces turbulence on the backside. It is a proven design used by most dive fin manufacturers. The foot pocket is of the open heel/adjustable strap type. This design will allow the use of a bootie and is therefore acceptable for either warm or cold water diving. The adjustable strap allows the fin to fit nearly all foot sizes and I was especially pleased with the security of the buckle. Most new fins are coated with silicone grease to preserve the rubber and this causes the straps to slip until the grease wears off. But the locking device on the Fara-Fin X was so tight that even with the grease, the straps did not slip. Another important feature of the foot pocket is rigidity. Some fins double over in the foot pocket during the down kick, thus putting pressure on the sole of the foot. The Fara-Fin X, however, has no such problems and the foot pocket remained stable even during my hardest kicks.

The blade is eight and one-half inches at its widest point and 11 inches from the tip to the toe of the foot pocket. Although this blade size may be too large for a 100 pound woman or too small for a 250 pound football player, for most people, including myself, it seems to be just the right size. During the down kick, the fin blade develops the proper amount of curvature and thus the maximum thrust. Many fins either double over during the down kick or are too rigid to produce any curvature except with maximum effort. The blade of the Fara-Fin X has neither problems.

Of course, the only proper way to choose a pair of fins for yourself is to try several in a swimming pool or in open water. When you do, remember to evaluate most critically the fin's performance during a comfortable endurance kick. When you face a long swim back to the boat or to the beach or when you are concerned about air consumption, endurance will be far more important than speed or power. And, if the Fara-Fin X is among those that you try, I am sure you will rank it among the top fins. In my tests, I found none that was significantly better. From Farallon/Oceanic, The Fara-Fin X retails for \$37. See it at your dive store. ➤

"Methought I saw 1000 fearful wrecks; 10,000 men that fishes gnawed upon; Wedges of gold, great anchors, heaps of pearl, inestimable stone, unvalued jewels; All scattered on the bottom of the sea."

This is Shakespeare's vision of the ocean bottom as he describes it in *Richard III*, but it could just as easily be a 20th century wreck diver's impossible dream. But some dreams come true and today's avid wreck divers would probably settle for just one discovery of a virgin wreck — a derelict vessel that nobody else has explored.

Like the underwater photographer who seeks that once-in-a-lifetime snapshot, the devout wreck diver might spend a lifetime searching for the dream ship harboring a cache of gold or historical and classical treasure-type finds. But treasure is not the primary motivation behind many wreck divers' aspirations. Most will be satisfied with just the discovery.

There are thousands of wrecks off the East Coast of the U.S. that divers would rejoice in finding, some with precious cargoes and others with historical significance. With the help of world renowned shipwreck authority, Jean Haviland, I chose ten enticing, virgin wrecks, scattered along the East Coast of the U.S., just waiting for a diver.

The Republic — In 1909, \$3 million in \$10 gold pieces went to the bottom of the sea 12 miles S.W. of Nantucket, Massachusetts. Imagine what that treasure would be worth today!

The 15,000 ton White Star liner, *Republic*, sailed from New York on January 22, 1909, bound for Gibraltar and the Mediterranean. There were 440 passengers aboard, many of them wealthy and so-

cially prominent people who looked forward to cruising the warm climes of the Mediterranean. In addition to her general cargo, the *Republic* carried large quantities of supplies for Admiral Sperry's fleet, returning from its triumphant cruise around the world. A payroll of \$3 million in American \$10 gold pieces (called Gold Eagles) was locked securely in vaults below decks.

Running into heavy fog 26 miles S.W. of Nantucket, the *Republic* was rammed by the liner *Florida*. Four passengers aboard the *Republic* were killed instantly when the *Florida's* bow cut more than halfway through the White Star liner's 68 foot beam.

The wireless operator, later credited with saving over 1600 lives, stuck to his radio while water poured into the *Republic's* hull. Three vessels, the *Baltic*, *Lorraine* and *Lucania*, raced to the rescue. In one of the biggest at-sea transfers in history, 83 boatloads of passengers and crew from the two ships were transferred to the *Baltic*. The *Florida*, crippled but seaworthy, was manned by a skeleton crew and headed for New York, with the *Lorraine* trailing behind.

Coast Guard cutters *Gresham* and *Seneca* tried to tow the *Republic* into shallow water, but the mammoth ship slowly filled with water and was impossible to pull. On January 23, 1909, exploding bulkheads and escaping air broke the silence of the fog-bound seas as the *Republic's* bow arched high in the air, and

the treasure-laden liner shot to the bottom sternfirst. She is listed as being wrecked in 240 feet of water, 12 miles S.W. of Nantucket Lightship. Underwriters made no attempt to salvage her.

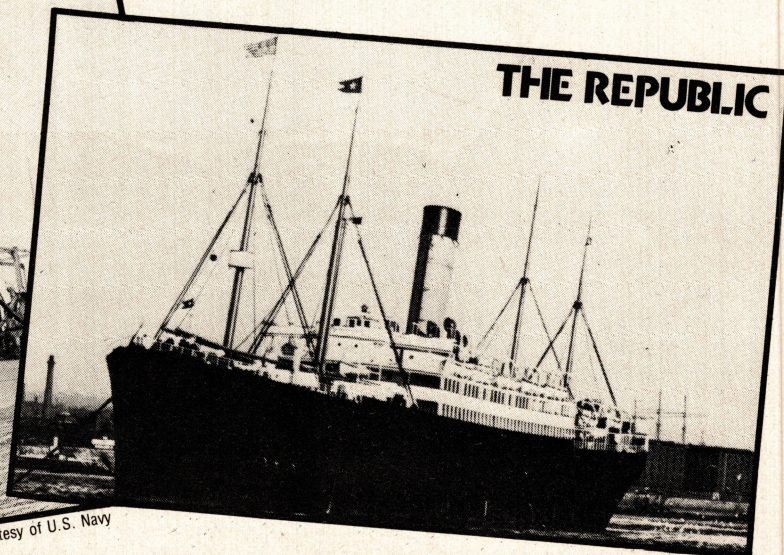
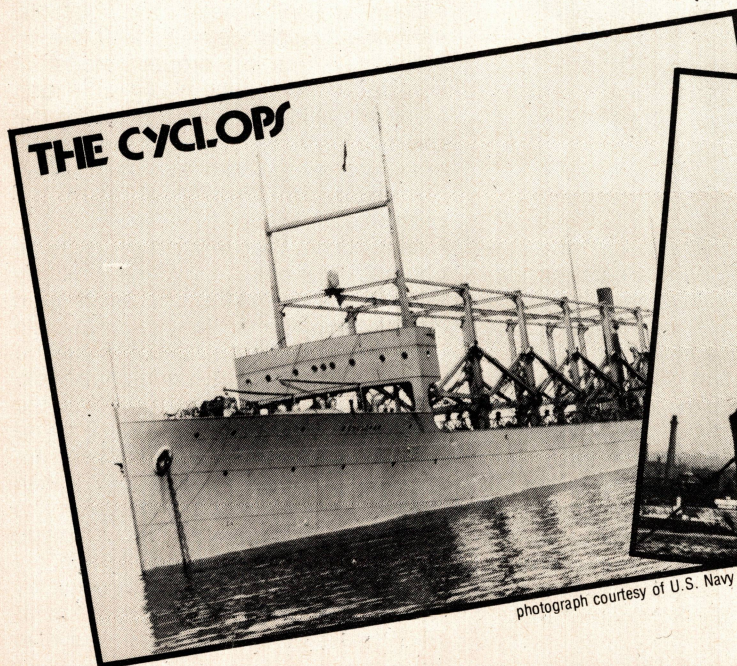
The Polias — At 3000 tons, the *Polias*, built in Flushing, New York in 1919, was small in comparison to luxury liners like the *Republic*. For prurient treasure hunters she is totally worthless with nary a coin or jewel aboard her. But for dedicated wreck divers the *Polias* is a gem of marine heritage from bygone days, one of a fleet of 12 ships that few people have ever seen.

America entered World War I in the spring of 1917. Due to a heavy loss of merchant vessels from submarine warfare, the U.S. Shipping Board ordered a large fleet of steel ships to be built. This in turn, created a shortage of steel and the shipping board decided to try a fleet of 12 concrete vessels. An oddity of her day, the *Polias* cost \$950,000 to build and sailed to her doom on February 20, 1920, when she was less than one year old.

She dropped off a load of coal at Searsport, Maine and was enroute without cargo for Norfolk, Virginia when she piled up on Old Cilley Ledge, five miles off Port Clyde, Maine. The *Polias* was navigating in a full gale on a bitter cold night when she hit the ledge, one of the most hazardous spots off the coast. The rising tides and strong winds drove the cumbersome vessel further onto the

TOP 10 WRECKS OF THE EAST COAST

BY ELLSWORTH BOYD



photograph courtesy of U.S. Navy

ledge where heavy seas pounded her unmercifully. Ten crewmen and a third mate panicked, launched a lifeboat in defiance of the captain's orders, and disappeared without a trace. Had they remained aboard, they would have been rescued with the others later.

Many famous wreckmasters tried to free her, but the hefty concrete hulk held firm, almost as if she were cemented to the ledge. She remained there for several years until nature, in her own good time, did the wrecking job. The valiant *Polias* rolled off into deep water during a storm and that's where she lies today, a monument to the 12 concrete ships that lent a helping hand to America in her first world war.

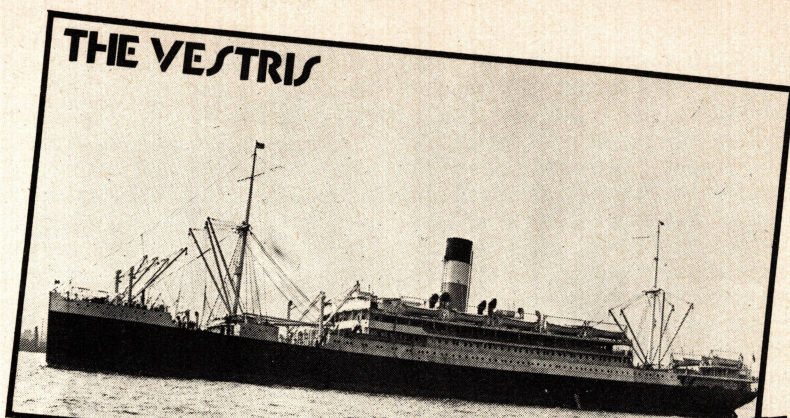
The Portland — One of 11 vessels that were totally destroyed during a savage northeaster that struck the Massachusetts coast on November 26, 1898, the *Portland* is a mysterious treasure ship divers would love to discover. There's \$18,000 in cash and jewels in her safe, plus an undisclosed quantity of uncut diamonds.

The 2284 ton steamer left Boston, bound for Portland, Maine, just before the storm struck. The storm raged for two and one-half days, destroying entire communities and ripping out giant seawalls and sturdy piers. Many people around the inland areas died, as well as those who were at sea. Devastation ran rampant, but the *Portland* remained the worst casualty of the storm.

The ship, her cargo, the 65 passengers and 64 crewmen were never seen again. The only indication of her fate came several days later when bodies and debris, identified as coming from the *Portland*, washed up on the Cape Cod beaches.

She remained a ghost ship, eclipsed by one of the worst northeasters in the history of the Old Colony state, until the

THE VESTRIS

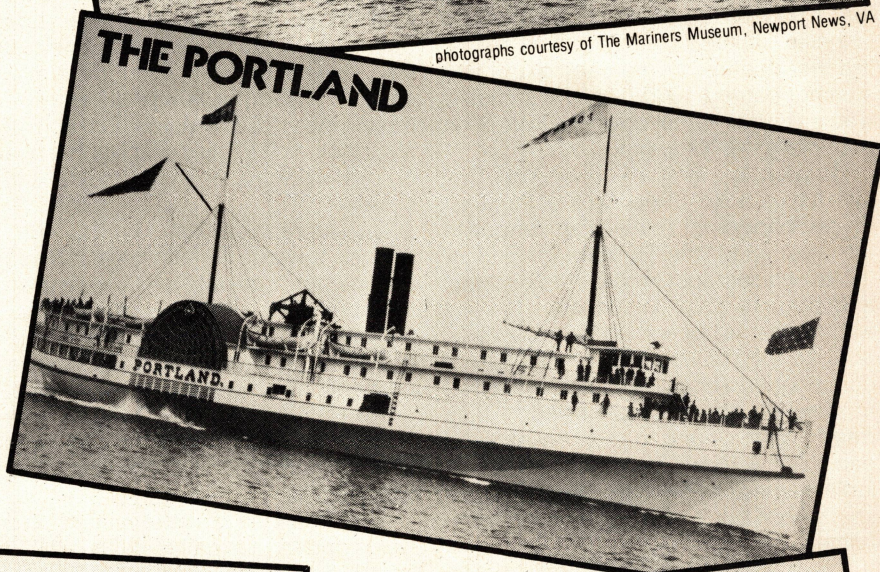


THE PAN MASSACHUSETTS

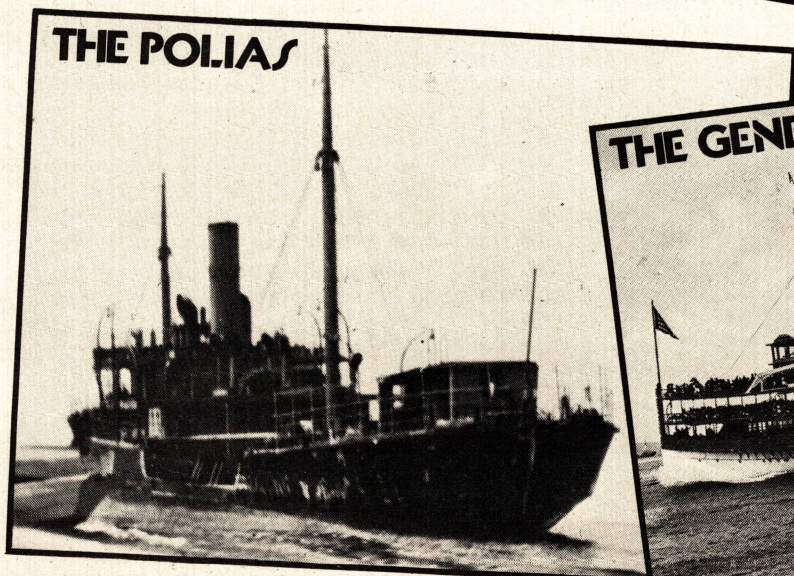


photographs courtesy of The Mariners Museum, Newport News, VA

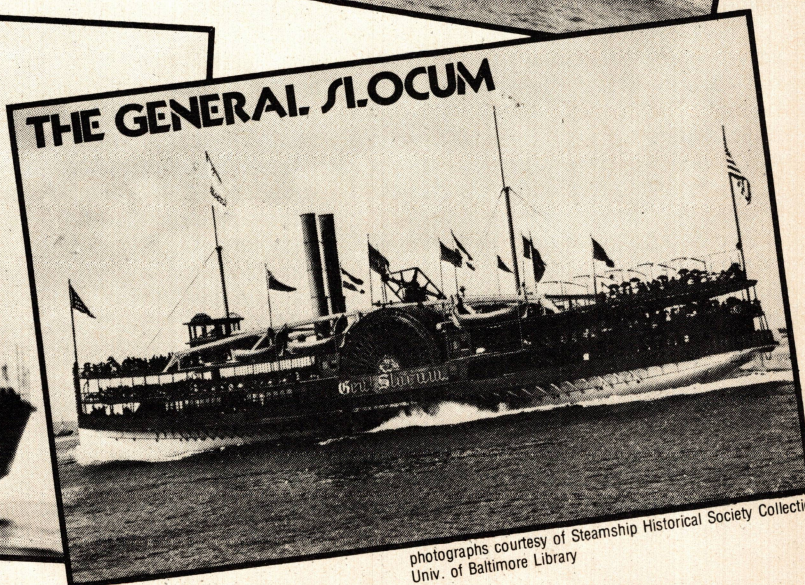
THE PORTLAND



THE POLIAS



THE GENERAL SLOCUM



photographs courtesy of Steamship Historical Society Collection, Univ. of Baltimore Library

early 1930's when a diver purportedly sighted her. He said that he had located a large wreck resembling the *Portland* nine miles northeast of Provincetown, Massachusetts. The diver reported, "The currents were sweeping me away from the hull which was too clogged with sand to permit further investigation." Although he took some bearings, the diver was never able to locate the wreck again.

If his report is correct, the *Portland* lies in 160 feet of water, nine miles N.N.E. of Provincetown. None of the cash, jewels or uncut diamonds were ever recovered.

The General Slocum/Maryland — She has two names, one after a confederate general and the other after the Free State, because this majestic side-wheeler was wrecked twice. The first time, as the *General Slocum*, she burned and sank in the East River. Resurrected and converted to the barge, *Maryland*, she foundered in a gale and sank off the South Jersey coast.

A German immigrants' Sunday school picnic turned into a roaring holocaust in June, 1904, when over 1000 people were burned to death or drowned in the second largest inland water disaster in history. Chartered by St. Mark's Evangelical Lutheran Church for its 17th annual picnic, the handsome side-wheel excursion steamer carried 1300 picnickers, mostly women and children, down the East River past Hellgate, New York.

Hellgate is a place in New York City just above 86th Street where the East River broadens into a bay, then runs off to the west under the Tri-Borough Bridge. It's a perilous spot where ripping tides and currents make it impossible to swim without the aid of some kind of artificial support. At this inauspicious site turmoil commenced aboard ship and many terror-stricken passengers leaped to their death. Smoldering hay, in a storage cabin below decks, burst into uncontrollable flames. In fighting the blaze, the ship's hose burst, leaving the crew's firefighters helpless.

The passengers reached for life preservers stowed in overhead compartments and found them wired to the beams. Those that were pulled down crumbled from dry rot. Over 1000 people were burned or drowned in less than one hour as passengers and crew panicked aboard the flaming side-wheeler.

Like an apparition from Hell, the riverboat ran up on the rocky shore of North Brothers Island to burn herself into a sooty derelict. The hulk of the *General Slocum* was raised and converted to the barge *Maryland*. In January, 1912, while carrying a cargo of coke from Camden to Newark, she foundered in a gale off Corson's Inlet along the South Jersey coast. One month later federal engineers decided she was a menace to navigation and blew out her sides, sending the

Maryland, alias *General Slocum*, to her final resting place.

The Debraak — The waters of the bantam state of Delaware harbor the mammoth treasure of the *Debraak*, \$40 million to be exact! Built in Holland in 1787, the 125 foot long teakwood sloop had a 30 foot beam and plenty of room for the gold and silver bars, jewels and coins she captured from Spanish treasure ships in 1797.

James Drew captained her under the British flag in 1797, and with a crew of 38 officers and seamen set out from Jamaica with a treasure cargo that was literally spilling out of the *Debraak's* hold. Overburdened and straining, the English ship was like a stuffed pig, ready to belch out its innards at the slightest provocation. That provocation arrived in the shape of a storm whose violent winds were stronger than any Captain Drew had ever encountered.

Drew ordered the vessel into a nearby bay (now Delaware Bay), near Cape James (now Cape Henlopen, DE). Unable to belch its cargo, the hulking sloop did what any heavy, unbalanced object in strong winds and high seas would do: It rolled over! Drew, 31 of his men, and six Spanish prisoners went down with the ship. Seven seamen scrambled into a small boat and put ashore at Lewestown (now Lewes, DE). Mementos from the ship, including Drew's clothing chest, are on display at the Zwaanendael Museum in Lewes.

The *Debraak* sank on May 25, 1798 in 90 feet of water. For the next 150 years they came — dozens of different divers, entrepreneurs, schemers, daredevils — all seeking the pot of gold at the end of the rainbow. None has succeeded, probably because there are over 125 wrecks in Delaware Bay. They call her the jinx ship now because of her original fate and the poor luck of the many salvage expeditions.

In 1937 a local minister named Jimmy Davis found a small gold bar on the beach near Lewes. As a result, Davis formulated a theory that the ship is not entombed in the bay, but is a ward of the sea. He says the *Debraak* is under tons of sand in shallow waters south of Lewes.

Searching for the *Debraak* is like buying a ticket to a \$40 million jackpot. The odds are stacked heavily against the gamblers, but somebody's got to win sometime and end the jinx of the Delaware treasure sloop.

The Vestris — Divers who find the wreck of the *Vestris* will think they're on the *Andrea Doria*. The 10,494 ton Lamport and Holt Steamship Lines passenger ship was one of the most luxurious liners of its day. It was 552 feet long with a 62 foot beam and accommodations for 280 first, 160 second, and 400 third class passengers. Launched in Bel-

fast, Ireland in 1912 by owners who spared no expense in equipping her with every convenience for the comfort and amusement of her passengers, the twin-screw steamship was heralded for her contemporary design.

But the good times between New York, Brazil, Uruguay and the Argentine Republic lasted only 16 years. The luxury liner sank on November 12, 1928, 250 miles off the Virginia Capes with a loss of 108 lives. It was a needless loss and one that could have been prevented if the dock superintendent had been more alert and if the captain had radioed his SOS sooner.

Coal was loaded into the bunkers through doors on the side of the ship, but four inches above the waterline one of the doors was defective and wouldn't close all the way. The opening was only a couple of inches wide and the ship departed Hoboken bound for South America in this unseaworthy condition. Two days of rough seas forced water through the opening, past the bulkhead and down into the coal bunkers.

The captain delayed sending an SOS when his ship took on a slight list, then found himself in a dire strait when the coal and cargo shifted, and the list became more serious at 30 degrees. The list made it difficult to launch the lifeboats when the order was given to abandon ship. That's when some of the inexperienced crewmen forgot to put the drain-plugs in the lifeboats and many of them capsized. Everything happened so fast that most people didn't realize the seriousness of it all until they found themselves in the water, drifting in the open sea! Only 125 passengers and crew lived to tell about their nightmare at sea. If divers find the *Vestris*, she'll be intact, a capsized ship, a victim of a needless tragedy.

The Lynx — Of all the wrecks off the coast of North Carolina, the blockade runners remain the glamour girls of the sea. She lived up to her name: *Lynx*, a wildcat flirting with danger, furtively smuggling arms and munitions past Union blockades. She belonged to an era never to be forgotten in the annals of American history when a predominantly agricultural Confederacy needed guns, machinery and raw materials in order to survive during our infamous Civil War.

Painted the color of a Hatteras fog so she could remain inconspicuous, and burning smokeless anthracite, the long, low side-wheel steamer delivered her goods to Wilmington, North Carolina, the principal port for blockade runners. Then the *Lynx* headed out of Swash Channel, bound for Bermuda with a load of cotton and \$50,000 worth of gold; payment for cargo consigned to the Confederacy. But, at 8 pm she was sighted by the Union vessels, *Nippon*, *Bucking-*

ham and *Howquah*, patrolling the waters outside of Ft. Fisher, the North Carolina bastion guarding the entrance to the Cape Fear River on which Wilmington was situated.

Then the spider and fly, cat and mouse, wildcat and hunter game commenced. The *Lynx* was so fast she almost succeeded in running between the Union ships and the shore, and out to sea. Supporting Confederate gunfire from shore helped a little bit, but not enough. The *Howquah* fired two percussion shells from her 30 pound rifles, one striking the *Lynx*'s paddle box and the second damaging the forward structure. The *Nippon* hit her too, with several broadsides below the waterline, forcing the *Lynx* to turn back toward shore where she ran aground near Half Moon Battery. The *Howquah*, with an injured crewman struck by a 30 pound percussion shell, abandoned pursuit and sought out a surgeon aboard the *Buckingham*. Most of the gold and some of the cotton was salvaged before the *Lynx* burned and sank in shallow water, five miles above Ft. Fisher near Half Moon Battery.

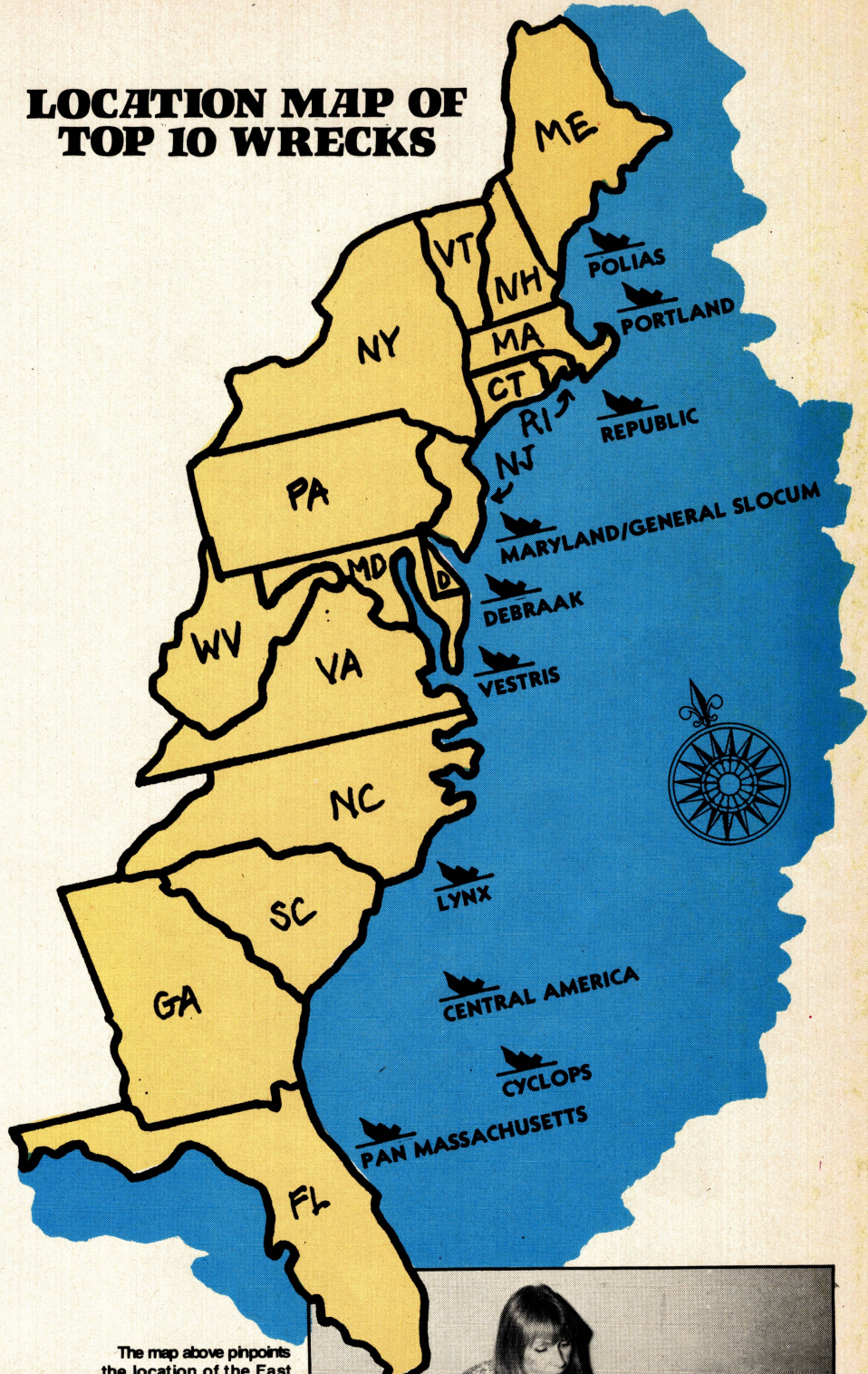
The Cyclops — Divers who find the *Cyclops* might solve the mystery of the Bermuda Triangle. In one of the greatest quests in history, the U.S. Navy conducted an extensive sea search that left no stone untouched, yet not a trace of the ship was found. How could a 19,000 ton vessel with a complement of 205 men and a valuable cargo of manganese ore disappear completely? The Navy would love to know the answer.

The *Cyclops* sailed from Barbados, March 4, 1918. As time passed and nothing was heard from her, the Navy ordered a search throughout the West Indies, the Spanish Main and along the north coast of South America. Cruisers and destroyers explored every bay and inlet of the islands and scanned every known reef. If driven ashore, surely she would have been seen with her eight steel derricks resembling a composite of several battleships.

As the months passed, the huge collier was given up for lost. "Torpedoed without a trace," was the common conjecture. But a vessel of that magnitude would have left wreckage and bodies adrift on the face of the deep. Another theory is that fumes from the manganese in her hold asphyxiated the crew, but strict precautionary measures had been taken to eliminate that danger. Some naval officers believe that the *Cyclops* went down with all on board in a hurricane somewhere in the Bermuda Triangle. In case of a heavy list, at least 45 degrees to port or starboard, the massive derricks could have toppled her over to one side, immediately sinking the eight year old vessel. Still another theory is that

(Continued on Page 78)

LOCATION MAP OF TOP 10 WRECKS



The map above pinpoints the location of the East Coast's top ten wrecks. Right, Jean Haviland researching wrecks from the extensive collection of newspaper clippings she has gathered over the years.



photograph by Ellsworth Boyd

don't be afraid to **GET CLOSE**

Vast array of lenses lets photographer get close to the action Text and Photography by Jim and Cathy Church

The purpose of this article is to give you a closer look at close-up lenses for U/W photography. For Nikonos users, we will concentrate on the specific lenses that are currently available in the U.S. And for housed camera users, we will give our views on which lens types are best for close-up work.

HYDRO PHOTO C/U LENSES

Three Hydro Photo close-up lenses — the T1, T2 and T3 — are designed for use with the Nikonos 35mm lens. Their plastic mounts screw directly into the accessory threads of the Nikonos 35mm lens mount. But if the accessory threads of your Nikonos lens are dented, non-threaded models of these close-up lenses

can be ordered. These are a press fit into a Nikonos lens hood (also called lens shade or filter adapter ring). The flexible, plastic lens hood can often be screwed into damaged lens mount threads without causing further damage.

Lenses T1 and T2 consist of two O-ring sealed lenses, with dry nitrogen between them to prevent fogging, in a plastic lens mount. The T3, and the 12-28, are both

single, miniscus lenses in plastic mounts. All Hydro Photo lenses are water-contact lenses made of optical glass — there is no plastic between the Nikonos lens and the close-up subject.

The 12-28, a special Hydro Photo close-up lens, is designed for use with the Nikonos 28mm lens. With the Nikonos lens focused for 2 feet, the focused subject distance with the 12-28 in place will be 12 inches from the lens mount, with a depth of field of about 7 to 17 inches at f22. With the Nikonos lens set for 6 feet, the subject distance is 16 inches with a subject area of 10 x 15 inches; and when set for infinity, the subject distance is 20 inches with a subject area of 12 x 18 inches.

An adjustable wand and two fixed framers are available for aiming the camera at close-up distances. The wand has nylon stops for setting the length to match the subject distances of the T1 and T2. With T3, the lens-to-subject distance is 6.5 inches beyond the tip of the wand. You estimate this additional distance by eye, or with a reference such as the distance between the ends of your thumb and little finger.

The framers have twin prongs which



show the left and right picture angles of the lens. The 35mm framer shows the exact distance for the T1 lens and half the distance for the T2. The 28mm framer has twin six-inch rods which show half the subject distance for the 12-28 close-up lens when you are photographing at 12 inches. A framer rod that reaches only halfway to the subject helps eliminate the problems of working in confined areas where wands, rods or framers can bump the subject area.

Hydro Photo recommends that you leave their close-up lenses screwed into your Nikonos lens between dives. Should you drop the camera, or should someone drop a weightbelt on it, the Hydro Photo close-up lens mount will protect the

Nikonos lens assembly. And if the close-up lens is damaged, you can send it back to Hydro Photo — it is unconditionally guaranteed.

Hydro Photo close-up lenses can also be used in air. With the Nikonos 35mm lens set for infinity, the approximate distances and subject areas are as follows: With T1, the distance is 4 inches with a subject area of 3 x 4.5 inches. With T2, the distance is 5.6 inches with a 4 x 6 inch subject area. And with T3, the distance is 6 inches with a 7 x 11 inch subject area.

All of the Hydro close-up lenses retail for \$45 each; and the adjustable wand, or either the 35mm or 28mm framer, retails for \$15 each. You can order directly from Hydro Photo (Route 1, Box 548, Port Ludlow, WA 98365). A brochure describing the lenses in detail is available free on request.

MICRO LENS III

The Micro Lens III is a two-element, color-corrected lens system sealed between two plexiglass ports inside a stainless steel cylinder. The cylindrical lens mount is a gentle press fit over the Nikonos 35mm lens mount. Three nylon screws press against the Nikonos lens mount and hold the Micro Lens III in place. When using a new lens, the screws (and the nuts which secure them inside the lens body) should be adjusted to fit your particular lens. In some cases, you may have to do some slight trimming with a razor blade. And when adjusted properly, the Micro Lens III will be easy to attach or detach. Please note, the screws are not to be tightened after the Micro Lens III is installed — they are bearing surfaces. A short cord is supplied with the lens so it can't be lost if you decide to detach it from the Nikonos lens while underwater.

The cylindrical body is about 2.1 inches long and 2.25 inches in diameter. The optical system is recessed by .75 inch at the front and .5 inch at the rear of the body. Thus, while the Micro Lens III is larger and heavier than most other supplementary close-up lenses for the



Nikonos, it is virtually indestructible. The stainless steel body is extremely tough and does a good job of protecting the recessed optics.

In air, with the 35mm lens set for 2.75 feet, the subject distance is approximately 4.5 inches, and the subject area is about 3.5 x 5.25 inches. At infinity, the subject distance is about 6.3 inches with a 4.75 x 6.75 inch subject area.

Our tabled approximate subject distance and subject area measurements may differ from those given on some Micro Lens III instruction sheets. This may be due to a typing error or a slight model change. Also, although the Micro Lens III produces sharp images, we believe the advertised depth of field (4 inches at f22) is exaggerated.

The Micro Lens III is aimed by eye. Look over the top of the camera body from behind and align the subject area with the front of the camera. When the Nikonos lens is set for infinity, the subject area is close to the same height and width as the back of the Nikonos camera body. This gives you an indication of size perspective.

The Micro Lens III retails for \$59.95, and can be ordered directly from Micro Lens III (Box 331, Burbank, CA 91503). California residents please include six percent sales tax.

NIKON CLOSE-UP OUTFIT

The Nikon close-up lens can be used

with the Nikonos 28mm, 35mm and 80mm lenses. Its metal body fits over the Nikonos lens mount and is held in place at two spots: First, a support rod is attached to both the accessory shoe on top of the camera and the close-up lens body. Second, a fastening knob at the side of the close-up lens body causes an internal metal band to grip the Nikonos lens mount. Once installed, slots at the top and bottom of the close-up lens body allow air bubbles to escape.

A supporting bar, attached to the bottom of the close-up lens body, holds the field framers used to aim the camera. Separate framers are provided for each of the three lenses. With each framer, there is about three-eighths inch clearance between the edge of the subject area photographed and the inside edge of the framer. The subject distance — 9.25 inches, measured from the vertex (outer glass surface) of the close-up lens — is the same for all three lenses, in water or in air.

In air, the 35mm lens can be used with the 28mm framer, and the 80mm lens with the 35mm framer. Because the picture angle isn't refracted in air, the subject areas will be larger than underwater. The 35mm lens gives a subject area of 6.1 x 9.2 inches with depth of field from 8.2 to 10.7 inches. The 80mm lens gives a subject area of 2.09 x 3.11 inches with depth of field from about 9 to 9.5 inches.

The Nikon Close-Up Outfit provides

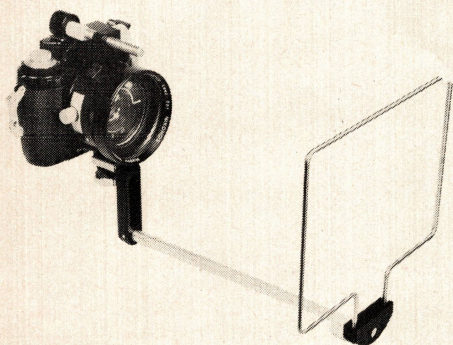
extremely sharp images from corner to corner, but it is significantly more expensive (\$320.50) than the other systems. It is distributed to dive shops by Aqua-Craft (7992 Miramar Rd., San Diego, CA 92126).

NOVATEK™ CLOSE-UP LENSES

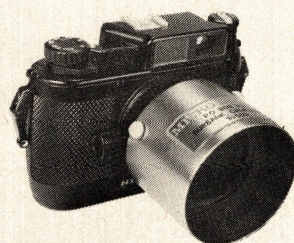
The Novatek Plus/2, Plus/3 and Plus/5 close-up lenses are a pressfit over the Nikonos 35mm lens, and can be installed or removed underwater. A nylon set-screw on one side of the lens mount provides the necessary tension to hold the lens in place.

Plus/2 and Plus/3 are single-element, water-contact lenses. They are no longer encased between flat plastic ports as were some earlier models. The Aqua-Craft 1980 Wishbook (catalog) states that the Plus/2 covers a range from 12 to 19.5 inches. These are the apparent close-up distances, from the front of the lens mount to the subject, for camera settings of 2.75 feet and infinity. The Plus/3, as stated in the catalog, covers a range from 7.75 to 10 inches. Note: These are the *apparent distances* as you see them, and are three-fourths of the *measured distances* shown on the labels. These labels show camera settings for measured close-up distances of 15.5, 17.8, 23.1 and 24.6 inches for the Plus/2, and 10, 10.9, 12.1 and 13.1 inches for Plus/3.

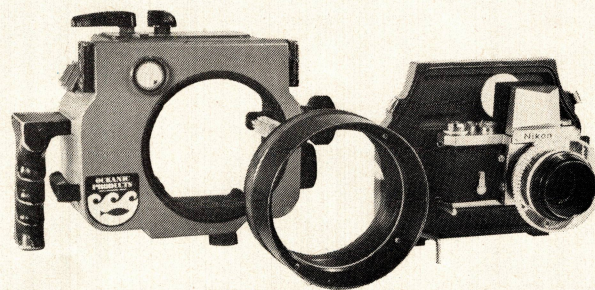
Neither the catalog nor the directions accompanying the lenses (at this writing)



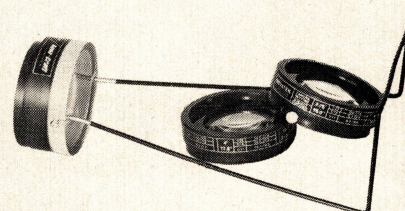
Nikon Close-up Outfit can be used with all Nikonos lenses. Framer is optional.



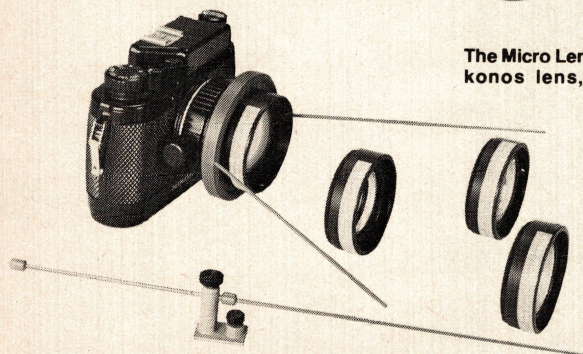
The Micro Lens III slips over the Nikonos lens, is aimed by eye.



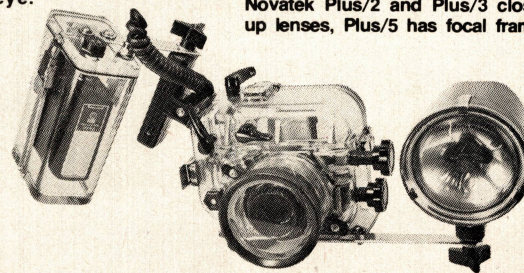
Farallon/Oceanic Hydro houses the Nikon F or Canon F-1 35mm SLR. Dome, flat ports available.



Novatek Plus/2 and Plus/3 close-up lenses, Plus/5 has focal frame.



Hydro Photo close-up lenses, with adjustable wand, framers for aiming.



Ikelite's clear cases house a variety of 35mm SLR cameras. Dome, flat ports are available.

give any indication of subject area. As a rule of thumb, the height of the U/W subject area (with a 35mm lens and close-up) will be approximately half the lens-to-subject distance. A distance of eight inches, for example, yields a height of about four inches. And the width will be 1.5 times the height. Thus, with a distance of eight inches, the width would be six inches ($1.5 \times 4 = 6$).

Both the Plus/2 and Plus/3 close-up lenses can be used in air. With the Nikonos lens set for infinity, the close-up distance with Plus/2 is 6.5 inches with a subject area of about 4.6 inches. And with Plus/3, the close-up distance is 4.25 inches with a subject area of about 2.6 x 4 inches.

A close-up aiming wand, made of aluminum and stainless steel, is available for use with the Plus/2 and Plus/3 lenses. The wand attaches to the accessory shoe at the top of the Nikonos and is adjustable for distance. To aim the camera, you place the tip of the wand over the top of the subject area.

The Novatek Plus/5 has a built-on focal framer which outlines half the picture area. You can attach the Plus/5 to your Nikonos 35mm lens so that either the top or bottom half is framed. We usually frame the bottom so that the framer doesn't cast a shadow on the subject when the strobe is aimed with a downward angle. The Plus/5 has two elements with dry nitrogen between them to prevent fogging. Due to the optical design and the nitrogen, Plus/5 has no magnification power in air — it is for U/W use only. At f22, with the Nikonos lens set for 2.75 feet, depth of field extends about one-half inch on either side of the framer. And with the lens set for infinity, depth of field begins at the framer and extends about an inch beyond. A special model of Plus/5 — #S-83 — is available for use

with the Nikonos 28mm lens only.

Novatek close-up lenses, and other U/W photographic products, are distributed by Aqua-Craft (7992 Miramar Rd., San Diego, CA 92126). Plus/2 and Plus/3 are \$45 each, Plus/5 is \$49.95 and the wand is \$12.50. The Aqua-Craft Wishbook is free upon request.

HOUSED CLOSE-UP SYSTEMS

Although cameras ranging from 110 snapshot cameras to the Pentax 6 x 7cm can be housed for U/W photography, 35mm SLR cameras are usually the choice of serious U/W photographers. These cameras are compact and can be used with a variety of lenses. Housings are readily available at affordable prices.

The size of the SLR viewfinder is a major consideration. When your eye is behind a facemask, and the camera is inside a housing, the increased eye-to-finder distance can make SLR viewfinding and focusing difficult in dim U/W light. Therefore, the extra-large finders — such as the DA-1 Sports Finder for the Nikon F series, and the Speed Finder for the Canon F-1 — are preferred over standard-sized viewfinders.

Choosing the correct lens is another important consideration. A close-focusing normal lens is usually the best choice for most close-up work. These lenses (sometimes called macro or micro lenses) usually have focal lengths of 50 or 55mm, and can be focused from infinity to less than one foot. With normal lenses without close-focusing capability, you can screw a standard close-up lens over the camera lens for close-up work. With this close-up lens in place, of course, you can't focus for long-distance shots without having to return to the surface and remove the close-up lens. While the extreme edges and corners of the pictures may not be as sharp as with a close-

focusing lens, most viewers won't be able to tell the difference in your slides and prints.

For close-ups of tiny critters which are difficult to approach, a 100mm or 105mm telephoto lens — either a close-focusing model, or a standard model with a supplementary close-up lens — can be used. But keep these points in mind: First, this is a special-purpose lens for U/W photography. Because of the shallow depth of field at close-up distances, focusing becomes more difficult — especially with moving subjects. Second, your choice of subjects will be limited to those small, hard-to-approach critters. Yes, you can photograph stationary subjects with a telephoto lens, but if the subject doesn't try to escape, you are better off working closer with a normal lens. The closer you get, the fewer the suspended particles between lens and subject.

You can use a dome port for close-up work, and many photographers use a single dome port for all of their U/W photography. Flat ports, however, are often best for close-ups. The refraction at the air/port/water interfaces narrows the U/W picture angle of the lens by about three-fourths. Thus, you can photograph smaller subject areas with the flat port. Because the flat port allows you to work a few inches further away from the subject, you are less likely to bump the subject area with the housing or port, and strobe lighting angles are easier to control.

WHICH IS BEST

There is no simple answer. Deciding which close-up lens system is best for you depends on what features you require and how much money you are willing to spend.

If you don't mind the added bulk and weight of a housed camera system, and insist on SLR viewfinding and focusing, a housed 35mm camera with a close-focusing 50 or 55mm lens is an excellent choice. And if money and even more bulk isn't a problem, you might choose a housed camera with a film format larger than 35mm to gain the increased negative size. The larger format is especially advantageous if you wish to enlarge prints to mural size.

If you want a compact, lightweight set of close-up lenses, with an aiming wand or accessory framer for your Nikonos, consider the Hydro Photo lenses. These screw-in lenses won't slip out of alignment with the Nikonos lens, and they protect the Nikonos lens threads from impact. The labels of T1, T2 and T3 give the subject distance for each lens. The label of the 12-28 gives focus settings for three different subject distances.

If rugged simplicity is your goal, consider the Micro Lens III. It's tough as an army tank and gives you a choice of two subject distances. It is, however, a bit heavy and bulky if you travel frequently.

The Nikon Close-Up Outfit is the top of
(Continued on Page 58)

CLOSE-UP LENS COMPARISON CHART

Close-up Lens	Subject distance set for minimum	Subject distance set for infinity	Subject area minimum distance setting	Depth of field f22 and minimum subject distance
Hydro Photo (35mm lens)				
Hydro Photo T1	4.75	—	2.25 x 3.25	4 to 5.5
Hydro Photo T2	8.5	—	4 x 6	7 to 10
Hydro Photo T3	15.0	—	8 x 12	12 to 18
Hydro Photo (28mm lens)				
Hydro Photo 12-28	12.0	20.0	8 x 12	7 to 17
Micro Lens III (35mm lens)	6.3	8.4	3.3 x 5	—
Nikon Close-up Outfit				
With 35mm lens	—	9.25	4.3 x 6.5	7.9 to 11
With 28mm lens	—	9.25	5.7 x 8.5	8.4 to 10.3
With 80mm lens	—	9.25	2.1 x 3.1	9.1 to 9.5
Novatek (35mm lens)				
Plus/2	15.5	24.6	8 x 12	13.2 to 19
Plus/3	10.0	13.1	5 x 7	9 to 11.4
Plus/5	8.5	9.5	4 x 6	8 to 9
(also avail. for 28mm)				

All measurements in approximate inches. Subject areas based on manufacturers' specifications, author's tests with a Nikonos lens focuser, or author's actual exposure tests. Exact subject area measurements are difficult because of pincushion distortion and slight errors in the angle of the lens to the subject which affect measurements. Subject distances (except for Nikon) are measured from the front of the close-up lens mount. Because of design changes, this chart may conflict with past, present or future published specifications.

PIPE LINE PENETR

**A Commercial
Diver's First
Hand Account
Of A Difficult
Pipeline Mission**
By Michael J. Ganas

"This is a hell of a way to make a living." I thought to myself as I crawled backward into the dark, circular enclosure. This was to be a dive performed for Burmah Oil Bahamas Ltd., at their South Riding Point Terminal, Grand Bahama and it required a survey to be taken of the interior of a ballast pipeline. Apprehension and amusement were some of the expressions I witnessed on the faces peering in at me as I backed into the foreboding darkness that engulfed me like a deep sleep. The narrow opening shrank to the size of a quarter as I reached the first 90 degree bend in the pipeline.

Already I was experiencing a mild fatigue; the kind that comes from elevated body temperature and restricted movement. I was perspiring heavily in the cramped space.

The ¾ inch shorty wetsuit and booties covered by a pair of overalls, a pair of jeans covering the overalls, socks covering the booties and taped to the jeans, 20 pounds of lead weight, a surface-supplied KMB-10 full facemask, a steel 72 bailout scuba tank on my back, plus a magnet in my left hand and video camera in my right hand, and underwater light clipped to my harness was the sum total of encumbering parapher-

nalía that added to my discomfort as I inched my way backward on forearms and knees. Trailing away from me was a safety line, air hose, commo wire, and video cable; all married together.

A bright, Bahamian sun had already increased the temperature in the 25 feet of exposed surface pipe before it curved smoothly underground, escaping the mid-morning heat. My feet dipped suddenly into the cool water in the bend.

"Entering the first bend," I announced. "Keep feeding me slack."

"Roger," came the reply.

All traces of earthly light vanished as my body slid into the blackness of the

36 inch steel pipe. The water quickly lowered my body temperature and my growing fatigue vanished. I was mildly surprised to find that the comfort of the cooling, buoyant water seemed to nullify the ominous, confining darkness of the pipeline. "So far, so good," I thought. "No claustrophobic reaction."

"Entering the second bend," I said as I discovered the change of pipeline direction a second time.

"Roger," came the reply. "Dave's entering the pipe to tend you." Because of the pipeline's double bend, I had opted for a tender at the 12 foot vertical section of pipe where the steel conduit curved into its subterranean environment. This was dangerous in itself, because if Dave became incapacitated while between the two bends, it was possible that he could block my exit from the narrow pipeline. However, when I discovered the heavy blistering and scaling along the pipeline walls, I felt more secure in knowing that he would keep my air-hose/lifeline from snagging on any protruberances within the double bend.

Pipe penetrations such as this are not uncommon to the dive industry, but this was my first since entering the commer-

Right up to the last moment before suiting up for the dive, I had the choice of using a dry suit or the wetsuit I was now wearing. Under normal circumstances a ballast pipeline can be flushed clean, given enough time. But because this operation was hampered by a rigorous shipping schedule, there just hadn't been sufficient time to adequately flush 4000 feet of pipeline. Had there been excessive amounts of crude still in the pipe, I would have had no alternative but to wear the dry suit. The heat buildup within the suit, along with the restricted movement within the pipeline, would have been torturous and because this was a one shot project to determine the extent of cathodic corrosion within the pipeline, I did not relish the idea of cutting short this data collecting dive because of heat exhaustion. Should this have happened, my company's reputation, Harrill Diving Contractors, would have been flawed and my professional ability would have been in serious doubt.

A commercial diver must always carefully weigh all the factors in any dive operation, not only in terms of safety, but also in relation to the success of the

versus the possibility of heat exhaustion. Heat exhaustion should be avoided at all costs when working in tight quarters because it can produce a claustrophobic reaction in the diver, who must always analyze his limits objectively.

Stopping beyond the second bend, I turned on my hand light. There proved to be sediment in the water which my passage through the pipe had disturbed. An eye straining inspection revealed that there was a fine layer of sludge on the bottom which could not be detected by feel. It was too feathery in nature. I remained still and the cloudy water settled enough to provide just a few inches of visibility.

"Turn on the camera light," I said. "I don't know if the camera will produce a picture. Visibility is poor."

"Turning on the light," came the reply.

After holding the camera at various angles, I was instructed by the corrosion expert to proceed another 100 feet into the line. While doing so, I was to feel along the top, sides, and bottom of the pipe and give a verbal account of my findings since the camera was not receiving much of a picture. The amount of corrosion was extensive. Blistering, scaling, and pitted channels are common phenomena occurring in pipelines carrying saltwater-crude oil mixtures. This is because electrical potentials come into play between water bearing and oil bearing metal surfaces, and deep cathodic pitting can take place along the bottom of the pipe where the heavier water flows. Continuous channels, two to ten inches across and one-half inch deep, were evident in the pipe. In its advanced stages, the pipeline will develop leaks.

As I backed deeper into the ballast line, I discovered that the drag I had anticipated from the hose and cables did not exist. I had brought a magnet with me in order to provide leverage to help pull the lines along as I proceeded further into the pipe. Since it was not needed, I left it sticking to the side of the pipe. I would recover it during my exit. Dave was doing an excellent job in the double bend.

At last I was at my destination and I gave the camera another try. But the low visibility within the line proved to be too much of an obstacle for the system to overcome. I was then instructed to exit the pipeline.

When I stepped once again into the bright sunlight, I could see another supertanker docking at the sea berth. Within the hour, the terminal flange would be bolted onto the end of the ballast pipeline and the ship would be pumping its precious cargo to the storage tanks ashore.

ATTENTION

cial diving field four years earlier. I had heard of penetrations into narrower pipe and had wondered how those divers had felt. At least I knew how Jonah must have felt when the great whale swallowed him.

Penetration dives are highly dangerous as a rule, and this particular one was compounded by the fact that the water in the line would contain residual crude oil which is harmful to the skin. Just how much crude was in the pipe before I began the dive could only be guessed at. This was a ballast pipeline and crude oil had leaked into it through a broken block valve.

project. There are certain risks that will always exist so you try to minimize them. But when you are dealing with a multi-billion dollar corporation, as in this case, your professional reputation can be critically impaired should you fail to do the proper job in the limited time allotted you. Thus you must be very analytical in your approach to objectives.

Therefore, when the water trickling out of the pipeline appeared clear and tasted crude-free, I naturally elected to use the wetsuit. But there was still the possibility that a layer of crude sludge could be resting on the bottom of the pipe. It was a question of skin irritation

UNDERSEA COLLECTION

Feodor Pitcairn



Red Sea

The 1981 Reef Dwellers calendar features the exotic underwater life of the Red Sea, including lionfish, pastel corals, vivid nudibranchs, and schools of colorful fish. Containing 13 spectacular full color photographs by Feodor Pitcairn, this calendar makes a perfect gift for home or office. Complete with accompanying description, you will want to save each of the photographs for framing when the year has past.

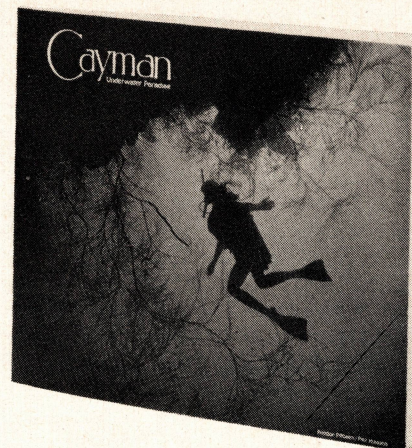
Cayman Underwater—Paradise

This stunningly beautiful book on the underwater life of the Cayman Islands has received the distinguished Neographics Gold Award for excellence. The book contains more than 70 full color photographs of underwater scenes, from tiny invertebrates to giant jewfish found on these amazing reefs.

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The 1981 Undersea Collection

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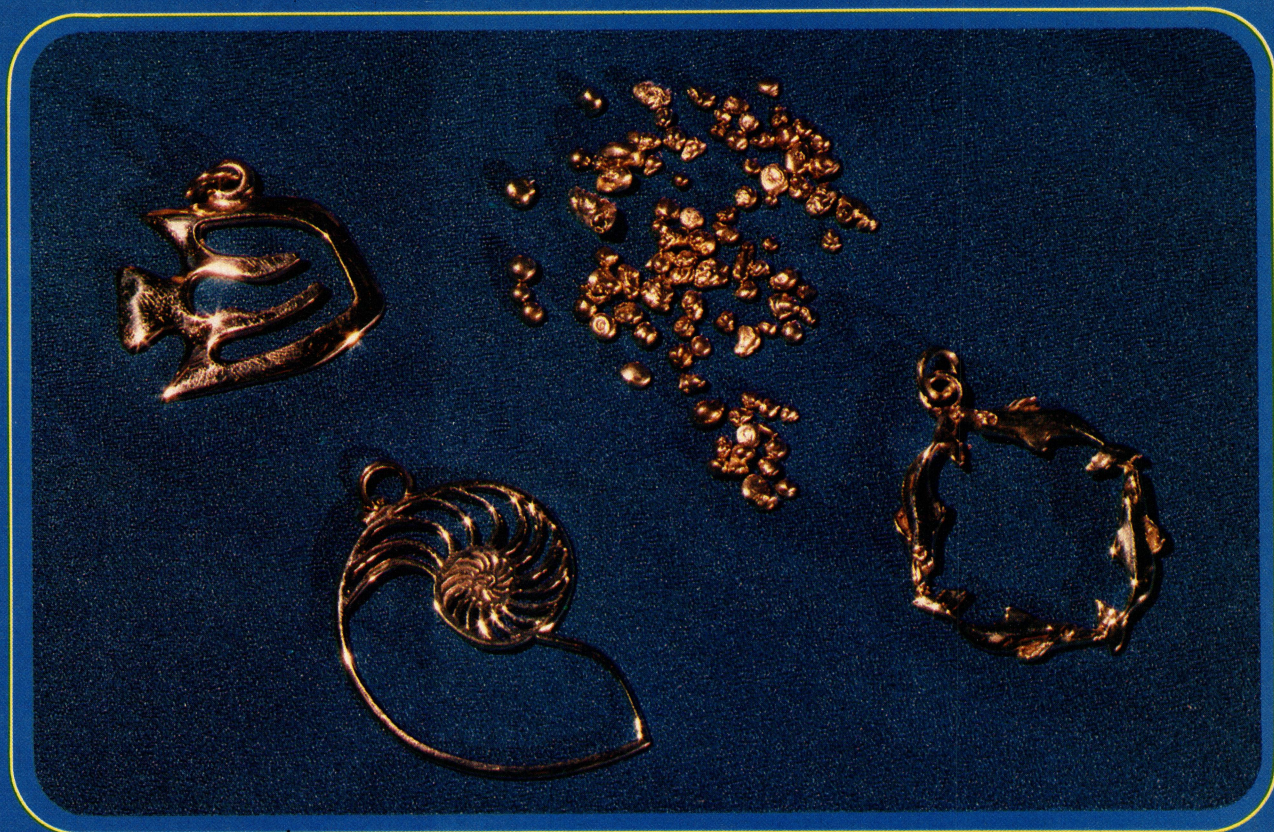
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Sea Jewelry

in gold or silver
for the collector/diver

By Robert L. Straight


What is gold and silver jewelry? With the ever increasing price of the noble metals, the traveling diver is more and more attracted to gold or silver souvenirs. There are a few terms relating to gold jewelry that we hear every day; yet does anyone really know what they mean? The one most often heard is 24 karat gold. Twenty-four karat is a term used to denote fine gold or 999 fine (bullion is always made of 24 karat). This kind of gold is very soft and is not practical for commercial jewelry. As I mentioned before, gold by itself is too soft so it must be alloyed with other metals, usually copper or silver, to make it harder. The karat number reveals the percentage of fine gold contained in jewelry. Eighteen karat is 75 percent gold, 14 karat is 58 percent gold, and 10 karat is 41 percent gold. Gold below

10K cannot be sold in the U.S. as gold.

The traveling diver sometimes mistakes gold filled and gold plated jewelry for karated gold. There is nothing wrong with this jewelry, but it is much less expensive than karated jewelry. The gold is applied only to the surface of the jewelry, and in time will wear off. If you dive in salt water with this type of gold, you will soon notice a green tinge — this is the base metal corroding.

If the jewelry is purchased in the states, it should carry the maker's trademark and karat mark. If you travel out of the country, you should still look for the karat marks. In Europe, fine gold will be stamped with numbers 750 or %*.

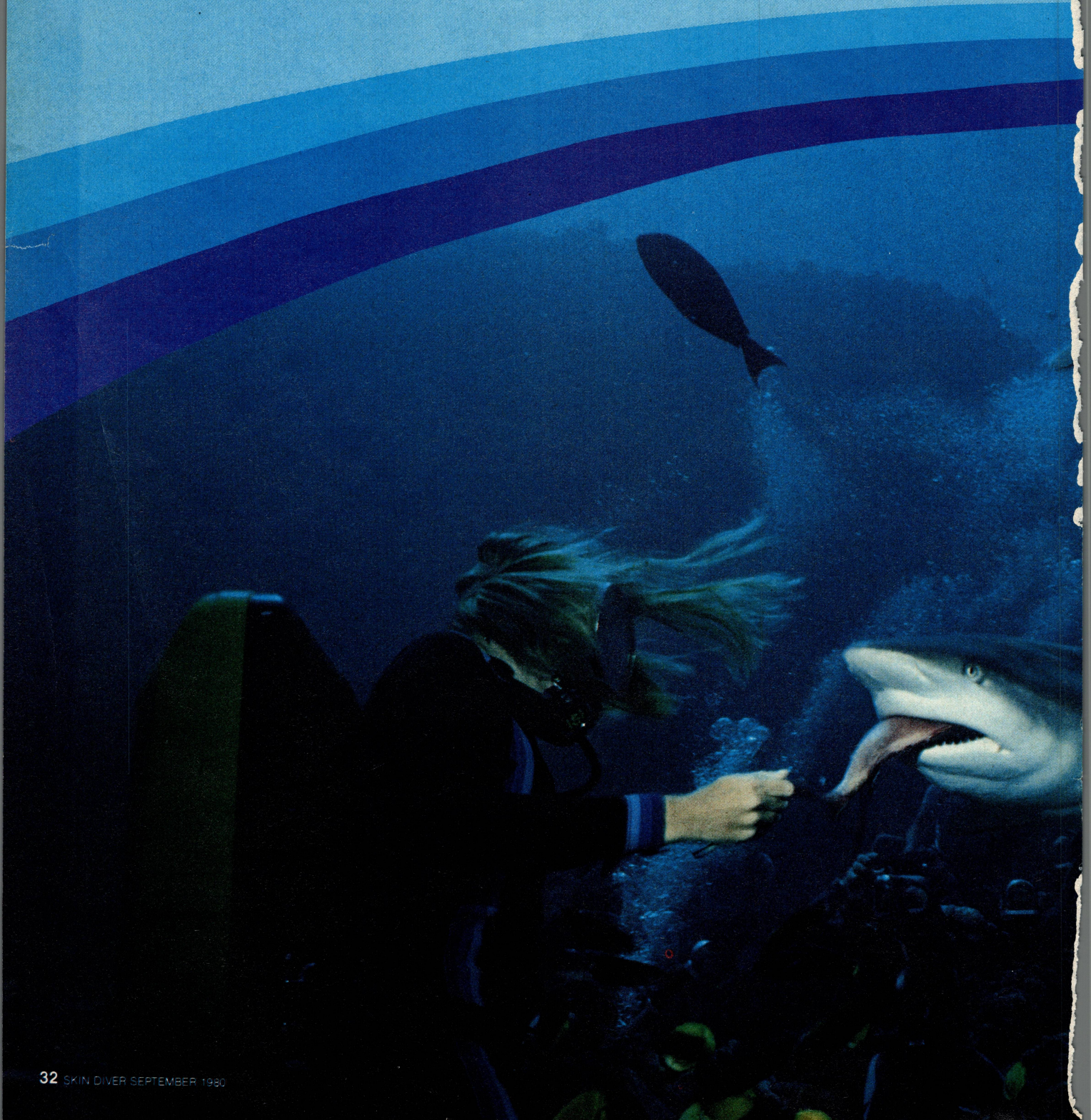
With the price of gold creeping up every day, and silver following a close second, the traveling diver might turn to silver jewelry. Silver, like gold, in its pure

state (as the trades call it fine or 999) is usually bullion and is too soft for jewelry. Again, we turn to alloys. Copper is generally used — it increases the hardness of the silver but creates a problem. The jewelry tarnishes or turns black and must be cleaned or polished at regular intervals. The silver pieces that you buy in the states should be marked with the manufacturer's trademark and the word sterling or ster. Sterling indicates that the metal is 925, or 850, parts silver, and 75 parts copper. European pieces will carry the numbers 925, or 850 because some countries allow more copper. Another term used with silver is coin silver, which is 90 percent silver and 10 percent copper. This was the U.S. coinage standard at one time. I hope these bits of information have stimulated your interest. 

Maldiv

Islands

The beginning of the 1980's is upon us and next to the Red Sea, the Maldives are the most popular European dive spot. The Republic of the Maldives lies about 400 miles southwest of Ceylon in the Indian Ocean and from north to south the islands cover nearly 550 miles. There are 1200 islands, segments of 19 atolls. The Maldivian atoll rings are the largest in the world and in fact, the word atoll is derived from the Maldivian language. Through the centuries this island group has always maintained its independence, with the exception of a short protection by Great Britain, followed by Maldivian independ-



ence again in 1965.

The capital of the Maldives is Male, which is located on the Male atoll. Tourism began in Male in 1972 and Italian and German divers have created dive businesses that have spread to the other islands. The islands that are dived the most are Villingili, Furana, Bandos, and Kurumba. Since sport diving is relatively new in the Maldives, the accommodations are not nearly as well developed as American favorites in the Caribbean. The hotel lodgings are bungalows made of coral rock and the water for showers is brackish. The islands that offer diving all have generators and compressors

and you will find assorted bars (with all kinds of liquor) and restaurants all of which prefer the U.S. dollar. Since all food other than that from the sea is imported, you shouldn't expect gourmet fare in the restaurants. But if you like to dive, you will be well compensated for your inconvenience. The lack of comfort certainly did not bother me, I came to dive!

I have visited the Maldives twice. The first time was in 1975 when I assisted Dr. John E. Randall, of the Bishop Museum, Hawaii, in a survey of the Maldives reef fishes. Scientists are always in a big hurry and during our eight day

trip we only dived Villingili, where our time was spent catching and measuring fish. There was no time for visiting other islands or getting to know the people. My second trip was in 1979 and this time I planned a real study of the islands. I chose to dive Villingili, then Bandos, and finally Kuredu. This last island is 80 miles north of Male and totally untouched by tourism.

You can reach Villingili by speed boat from the airport in about 20 minutes. The bungalows are built along the protected beach and right off it is a reef that is about 100 yards long. Here you can find many tame fishes such as butterflies,

Indian Ocean Offers A New And Exciting Frontier

By Helmet Debelius



photographs by Herwarth Voigtmann/IKAN

triggers, angels and surgeons. Although the coral formation is not intact, it is a good spot to snorkel and play with fish. The coral rubble is about 45 feet deep and drops off to a sandy bottom.

The outer Villingili reef is far more interesting. It drops off to 90 feet and along the wall you can find very nice caves and overhangs. Here you will see large numbers of sweetlips, groupers, and soldierfish. Beyond the reef in open water are big schools of bannerfish and butterflyfishes feeding on plankton, and along the base of the reef you can expect to see large wrasse and small whitetip sharks on patrol.

The Villingili dive station is operated by Subaqu, a dive agency from Munich, Germany. It offers 50 tanks and can fill to 3000 psi. Subaqu also offers boat trips to spots around the island. The Subaqu divemasters have a rather unusual trip for experienced divers: About 30 minutes by boat from Villingili is a 300 foot deep channel through the outer reef. At the beginning of the drop-off is a school of gray reef sharks on patrol. I was able to count 45 of them on one dive. There are also large schools of red snapper and naso-surgeons. Because the school of gray reef sharks are too shy to approach for photography, the divemasters use a trick to get them closer. They incite a feeding frenzy!

I made one trip with Hans, the divemaster, who is known as the shark-feed-master. We descended to about 75 feet and Hans brought along a bag full of bleeding fish leftovers from the hotel kitchen. There were four of us all together, and he showed us where to wait. He then swam about 50 feet away, already surrounded by large schools of snappers. When Hans emptied the bag, the snappers and surgeons started a wild chase after the fish scraps. Their smacking and snapping after the scraps provoked the sharks, causing them to rush to the scene like torpedos. Meanwhile the current had pushed some of the blood to us and in the middle of this chaos of crazy predators we clicked away with our cameras. It was a very busy dive: Boxing sharks, winding cameras, and trying to focus. I soon realized the trouble Al Giddings had at Eniwetok and Howard Hall at Marion Reef with this same species of shark.

Kuredu is a dream of an island which can be reached in 12 hours by boat from Male. Subaqu had just finished a com-

pressor station there and organized a boat trip. When I heard about it, I booked at once! The island is 1200 yards long and 250 yards wide. There are no paths through the palm woods and other than ten bungalows of twisted palmleaves, nature remains undisturbed. Although I have dived many of the world's most terrific areas, I found Kuredu to be the very best. Visibility was better than 150 feet, the coral reef was unspoiled, and the fish life was incredible! I dived like I have never dived before. It seems to me

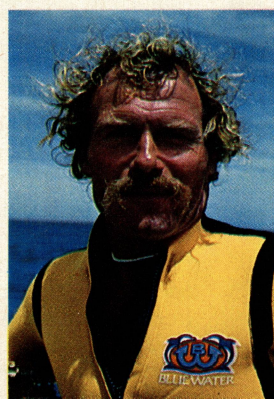
"The schools of fish I saw off Kuredu were unbelievable. The water was filled with beautiful stingrays, rare angelfishes, incredible surgeons, and magnificent clown triggerfish."

that a lot of divers miss much by diving too deep and spending many hours on the surface — many members of my group did this. But I dived shallow, tank after tank, staying on the surface only long enough to fill my tank and change the film in my cameras. The schools of fish I saw at Kuredu were unbelievable. The water was filled with beautiful stingrays, rare angelfishes, incredible surgeons, and magnificent clown triggerfish. We pulled large nurse sharks out of their holes, used resting turtles as

sea scooters, and were awed by the giant manta rays that passed above us.

I spent my last days diving on Bandos in the Male atoll ring. The dive station there has a two man decompression chamber and the accommodations on the island are comfortable. Divemaster Herwarth Voigtman teaches beginners in the ideal conditions of the lagoon, but he is better known for his unique relationship with sharks. Directly behind the Bandos drop-off lives a group of 18 gray reef sharks. For the last three years Herwarth has been experimenting with these animals and in 1978 he began taking his customers along to watch. After three years of feeding these sharks every day and approaching them closer each time, he has finally taught them to feed from his hand! Herwarth's theory is that the diver must establish himself as a dominant co-inhabitant of the sea. It is important that he prove to the sharks that his power is greater than theirs. Herwarth did this by driving them away from the bait with his elbows and fists and hitting them when necessary. Before becoming a diver, he used this technique as a circus trainer with lions and tigers. After the sharks demonstrated a healthy respect for Herwarth, he began offering food to them on a long stick. Then he simply continued to shorten the stick until the sharks were feeding from his hand! Now his show is perfect — he can





photograph by Geri Murphy

Herwarth Voigtmann

"We pulled large nurse sharks out of their holes, used resting turtles as sea scooters, and were awed by giant manta rays as they passed above us. Although I have spent much time in the Red Sea, this spot was better."

now feed the sharks with one hand and photograph them with the other. I never had the feeling of danger at Herwarth's show, as I did with the same species of shark incited to frenzy on Villingili. Herwarth has developed a new star for the 1980 show: His beautiful assistant Vreni. This 24 year old woman feeds the sharks while posing topless for cameras!

The best time to dive the Maldivian islands is from November to May, with March or April being the best months. See & Sea runs trips to the Maldives and I believe that once Americans discover them this will prove to be one of their most popular expeditions. The German travel agency offering tours to the Maldives is Subaqu-Reisen, Marktstr. 17, 8000 München 40, West Germany.

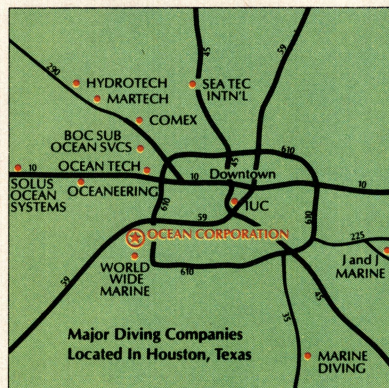
Herwarth and Vreni's shark show is available on film via Herwarth's wife in Germany. Write Mrs. Felicitas Voigtmann, Gustav-Jordan-Weg 8, 7427 Hayingen. 🐡

Why Houston?

BECAUSE

The Ocean Corporation is located in Houston and more commercial divers are hired in Houston than in any other place in the world. Twelve diving companies are located in Houston including three of the four largest in the U.S. Many others are located in the nearby New Orleans area. The demand for divers is so great in Houston that large locally based diving companies like Ocean Systems, Hydrotech

Systems, Martech International and Sea Tech International have hired many of our students for part-time work while they were attending school. Over 90% of our recent graduates went to work for these and other local diving companies when they completed our program. Houston is the place where the action is...the commercial diving, offshore construction and oil industry capital of the world.



BECAUSE

The Ocean Corporation is a commercial diving company, not just a school. Our facilities, equipment and training aids are the best, and our diving systems are as up-to-date as possible... because much of the equipment is used by our diving operations division to perform actual diving contracts in the field. Ocean Corporation has successfully completed many underwater jobs for various industrial clients over the years... including specialized underwater inspections, maintenance and repair work. For example, we did the world's first commercial underwater repair job in a nuclear power plant. And most of our divers have been graduates of our own school.

BECAUSE

The Ocean Corporation is a convenient and exciting place to go to school. Houston is one of the fastest-growing and most dynamic cities anywhere. It is a city of expansion, energy and youth (the average resident's age is in the mid-20's). Houston offers every conceivable kind of entertainment, from sports events, ultra-modern discos and open-air theater to rough-house local rodeos, chili cook-offs and the new Texas-size

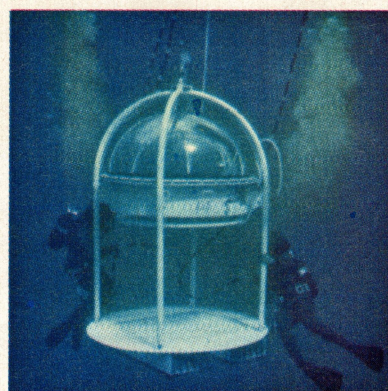
country-western dance clubs. Reasonably priced adult and singles apartments are readily available within walking distance of the school, and fast-food to luxury restaurants are nearby. The semi-tropical climate is wonderful, the sport diving is great and the folks are friendly.



BECAUSE

The Ocean Corporation management and instructor staff have long-term experience in the international offshore oilfield diving business. Retired ex-military divers and sport scuba divers don't run the school...commercial divers do. For example, the President of The Ocean Corporation, Larry

Cushman, was Vice President and Europe/Africa Area Manager for Ocean Systems, Inc. for three years...with responsibility for all North Sea diving and underwater construction operations. He also worked six years as a manager for Oceaneering International, Inc., another of the world's largest commercial diving contractors. Ocean Corporation managers and instructors know today's diving business...first-hand, from recent experience.



The Ocean Corporation

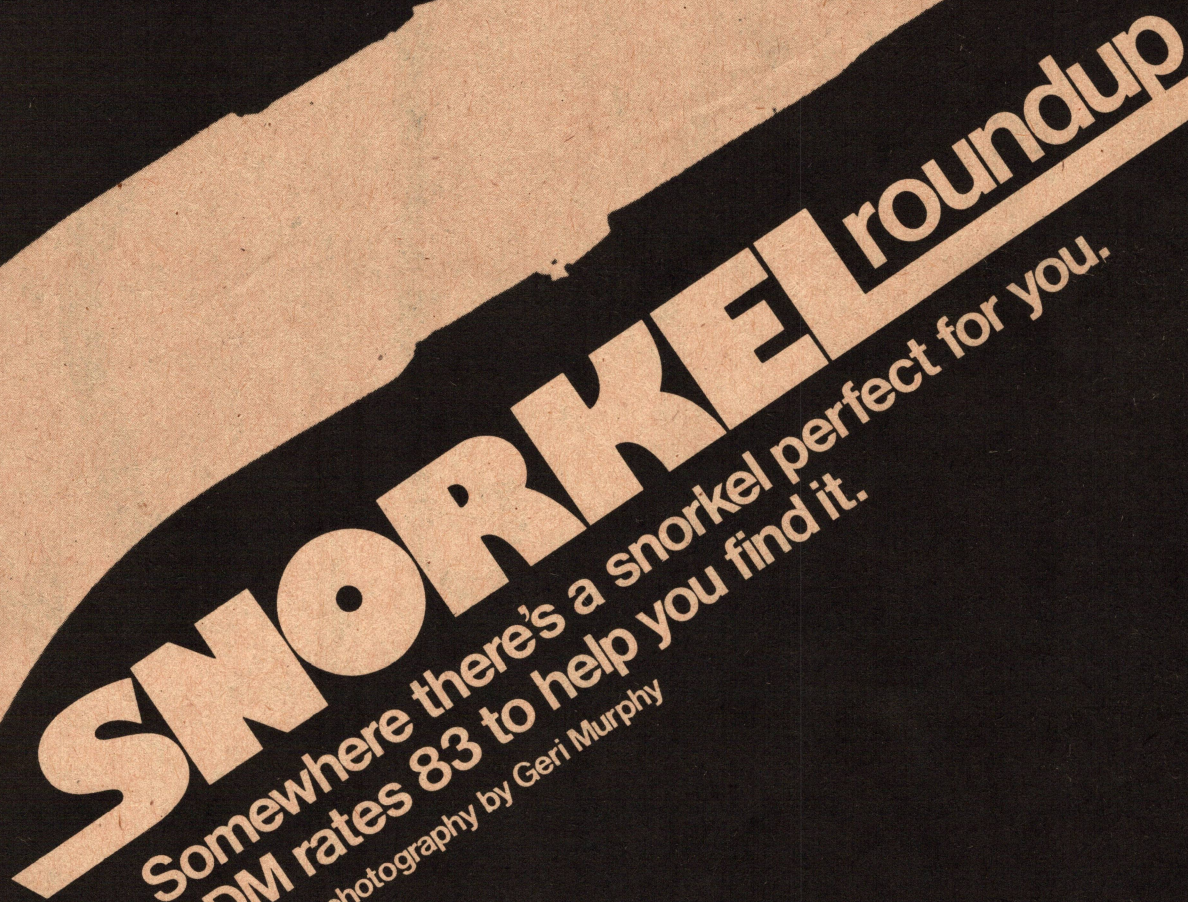
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If you are interested in becoming a commercial diver, please write and ask for our free information package on job opportunities, our school and our super city. If you'd rather call, make it collect and ask for Fred Tourtel
(713) 661-0033.



School of
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SNORKEL

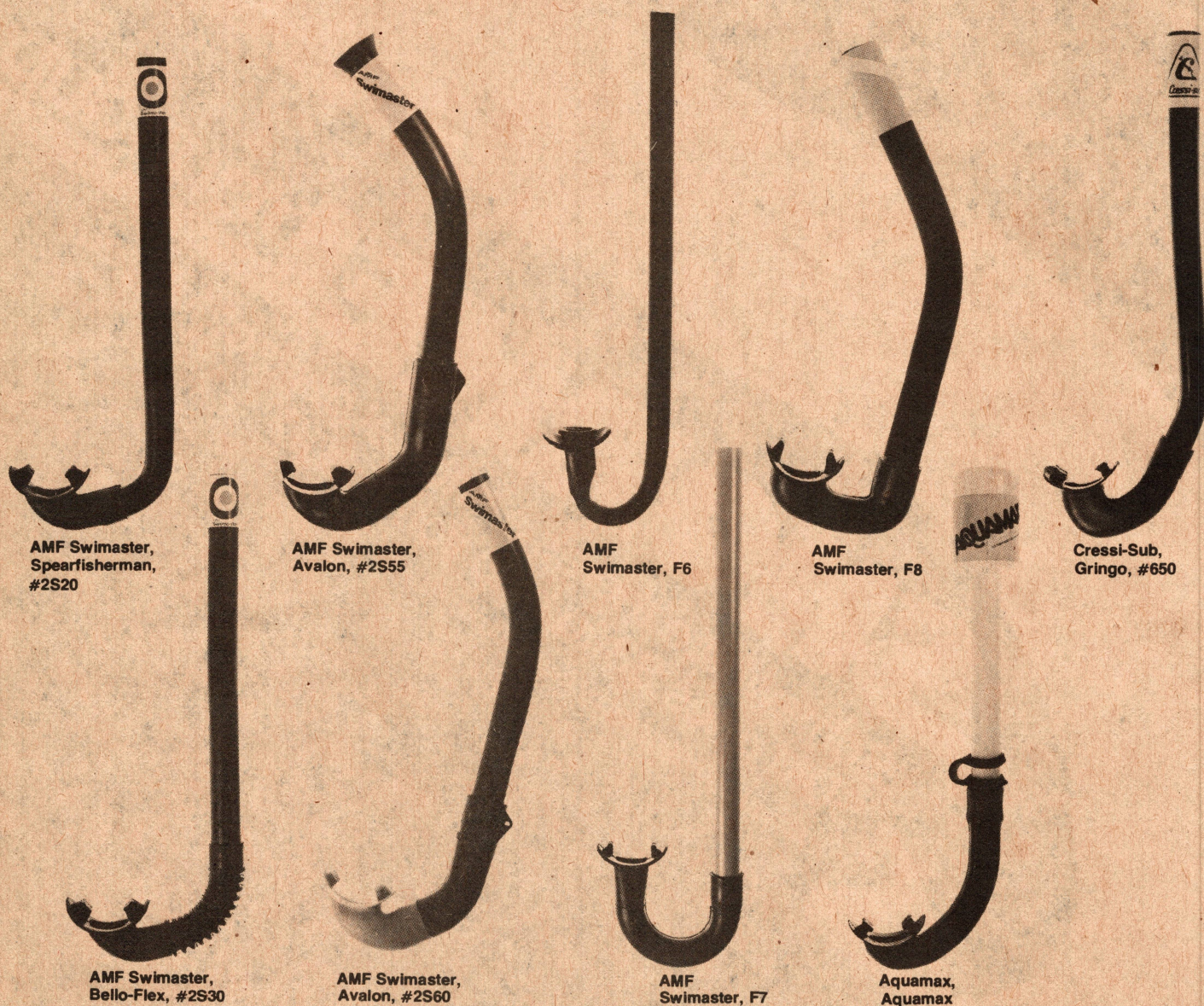
roundup

Somewhere there's a snorkel perfect for you.
SDM rates 83 to help you find it.

Text and photography by Geri Murphy

Special 12 page
Dive Equipment
Supplement by
Skin Diver Magazine

SNORKEL roundup



Ever since the first Egyptian put his head under the Nile and sucked air through a hollow reed, the concept of snorkeling has been popular. And although the snorkel has probably been used for over 3000 years, it has remained basically unchanged. It is used not only by all skin divers, but scuba divers as well — they consider it to be a piece of safety gear second only to the BC. The snorkel enables a diver to breathe comfortably on the surface without requiring the head to be lifted out of the water, an effort that may require as much as 30 percent of his/her energy. Scuba divers use snorkels to conserve air while swimming on the sur-

face to the dive site, where they switch over to scuba. If a long swim back to the boat or shore becomes necessary and there is no air in your scuba tank, then the snorkel becomes a lifeline on the surface, with the return swim easy and safe.

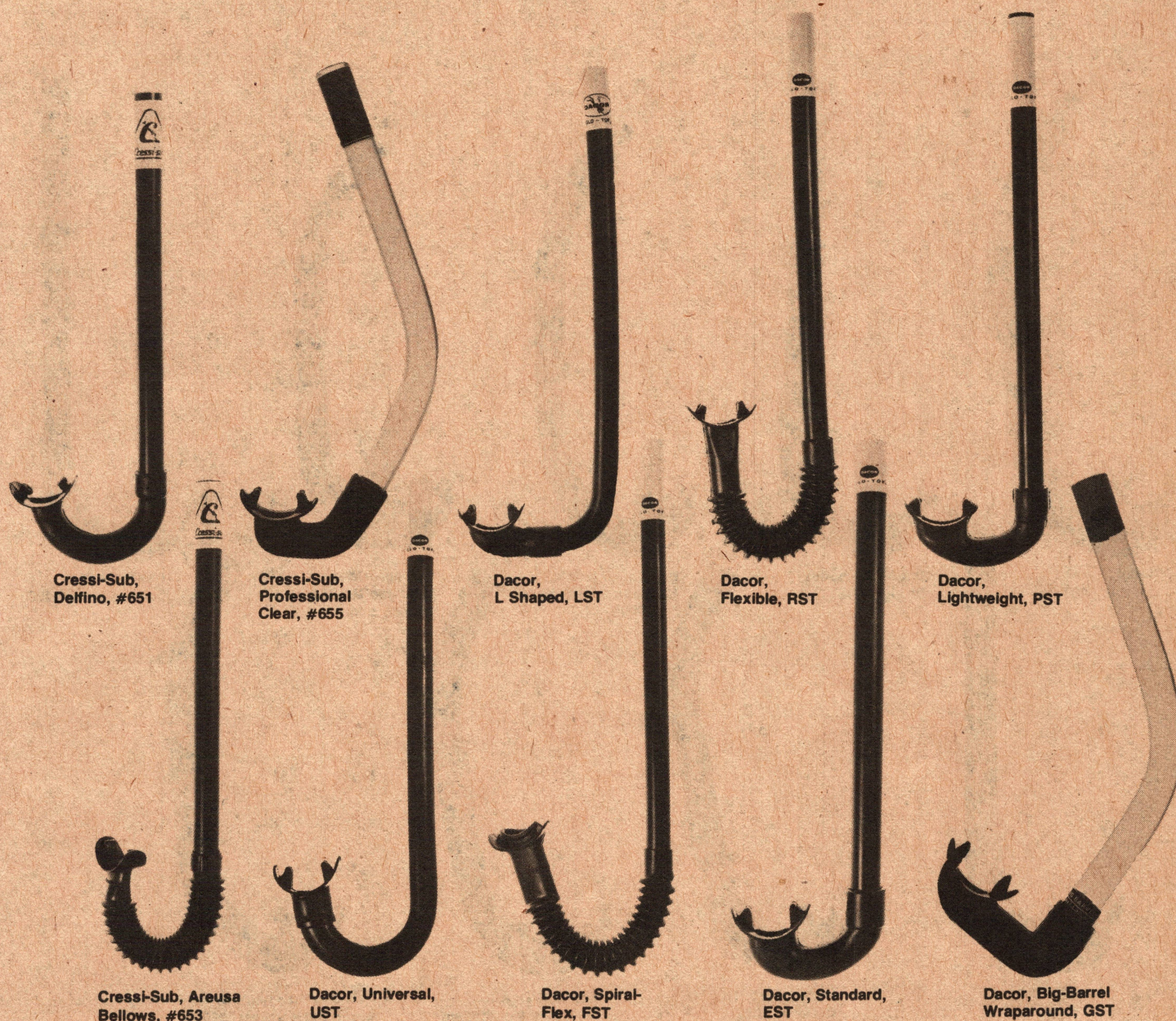
Snorkels come in a wide variety of designs, shapes and sizes. They offer features ranging from rotating, moldable mouthpieces to contoured barrels that flare at the tip. While one type of snorkel may be best suited for a scuba diver, it may be inadequate for the skin diver. There are many different features to consider when selecting a snorkel, but primarily it should fit comfortably, provide

adequate air flow, clear easily, and not retain water.

Choosing the right snorkel for your particular type of dive may not be as simple as you might think: There are more than 80 different models on the market. Before you buy your next snorkel, it would be wise to learn how one functions and what to expect from some of the various designs. It may make the difference between a relaxing, comfortable snorkel dive, or a choking, sputtering swim that drives you out of the water in red-faced frustration.

USING THE SNORKEL

A snorkel is simply a long hollow tube



which is usually 12 to 14 inches long and shaped like the letter J or L. Made of rubber or plastic, one end is fitted with a soft-rubber mouthpiece and the other is open. Generally, the snorkel is secured to the diver's facemask by means of a small rubber tab called a snorkel keeper. Most divers are taught to wear the snorkel on the left side of the head to avoid confusion or entanglement with the scuba regulator hose. However, the side to which you attach your snorkel is a matter of personal preference.

The name snorkel was derived from the word *sch snorkel*, the apparatus used by German submarines during World War II that allowed them to run just below

the surface while drawing fresh air into their hulls.

The snorkel-equipped diver lies face down in the water and draws air through the tube, one end of which fits in the mouth while the other protrudes from the water several inches above the head. The snorkel thus acts as an extension of your airway, allowing you to breathe comfortably and continuously with your face in the water.

When the tip of the snorkel dips below the surface, the tube floods with water and must be cleared upon surfacing. There are two methods of clearing a snorkel. One method is to forcefully exhale into the mouthpiece as soon as the top of

the snorkel breaks the surface. Clearing a snorkel by this blast method is much like shooting a pea shooter. The first inhalation after blasting is taken with caution in case there is some water still trapped in the tube. In that event, a second blast will usually clear any residual water. The second method is known as the displacement method. This technique is quite simple. When ascending, tilt your head back and look toward the surface, with the snorkel in your mouth. Just before you break the surface, blow gently into your snorkel, displacing the water with air. Upon reaching the surface, simply roll the head forward in the usual swimming position and resume

SNORKELroundup



Dacor, Turbo Contour, TBT



Dacor, Turboflex Straight, NST



Farallon/Oceanic, Moldable Mouthpiece, #1005



Farallon/Oceanic, Moldable Mouthpiece-Swivel, #1007



Healthways, Scubadiver, #1420



Dacor, Turbo Straight, TST



Dacor, Turboflex Contour, NBT



Farallon/Oceanic, Moldable Mouthpiece, #1004



Farallon/Oceanic, Moldable Mouthpiece-Swivel, #1006

breathing. The snorkel has already been cleared so you can start inhaling fresh air immediately. The displacement method is much more effective than blasting and requires only one-third the effort.

DESIGN

Snorkel designs have come a long way since the days of ping-pong balls sitting in little cages perched above the diver's head. Today, most snorkels are simple, streamlined and comfortable. But why does one snorkel perform better than another, even though they appear to be similar in design? To really understand the answer and fully appreciate the en-

gineering that goes into the production of a snorkel, an in-depth look at the components which make up the snorkel is necessary.

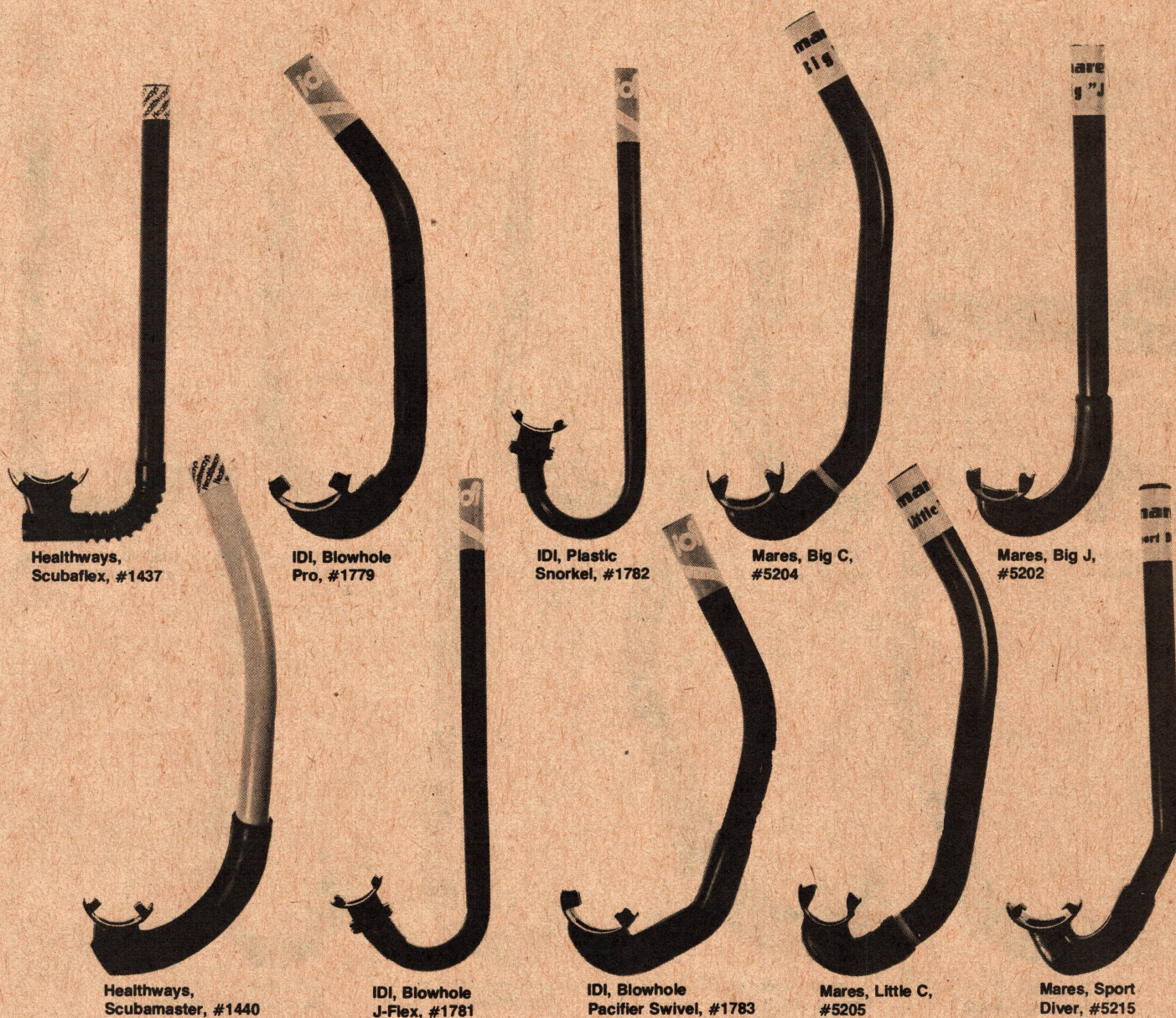
Regardless of whether the snorkel is extruded from the mold in a single piece, or is made of several mating components, it can best be described as having three separate segments which are fundamental to all snorkels. These basic ingredients are as follows: The barrel or pipe which protrudes above the surface of the water; the mouthpiece tube which connects the barrel to the third component; and the mouthpiece. Each of these three sections varies greatly in size,

shape and design.

THE BARREL

The top part or upper end of a snorkel is called the barrel, and it is usually made of hard or semi-rigid rubber. A few inexpensive models are made of plastic. There are three important features of the barrel that should be considered as they will significantly affect breathing resistance. They are: The length; the bore size (internal diameter); and the shape (bends, curves).

The average length of a snorkel ranges between 12 and 16 inches. Any length greater than 16 inches will be too long



and cause noticeably increased breathing resistance. Once your chest is more than 15 inches below the surface, the pressure will be such that expanding the lungs to breathe will be difficult. Additionally, extra long snorkels increase the amount of dead air space, resulting in excessive CO₂ build-up. A long snorkel is harder to clear and causes additional drag when swimming underwater. If any of these problems plague you because your snorkel is too long, a few inches can easily be removed with a serrated-edged knife.

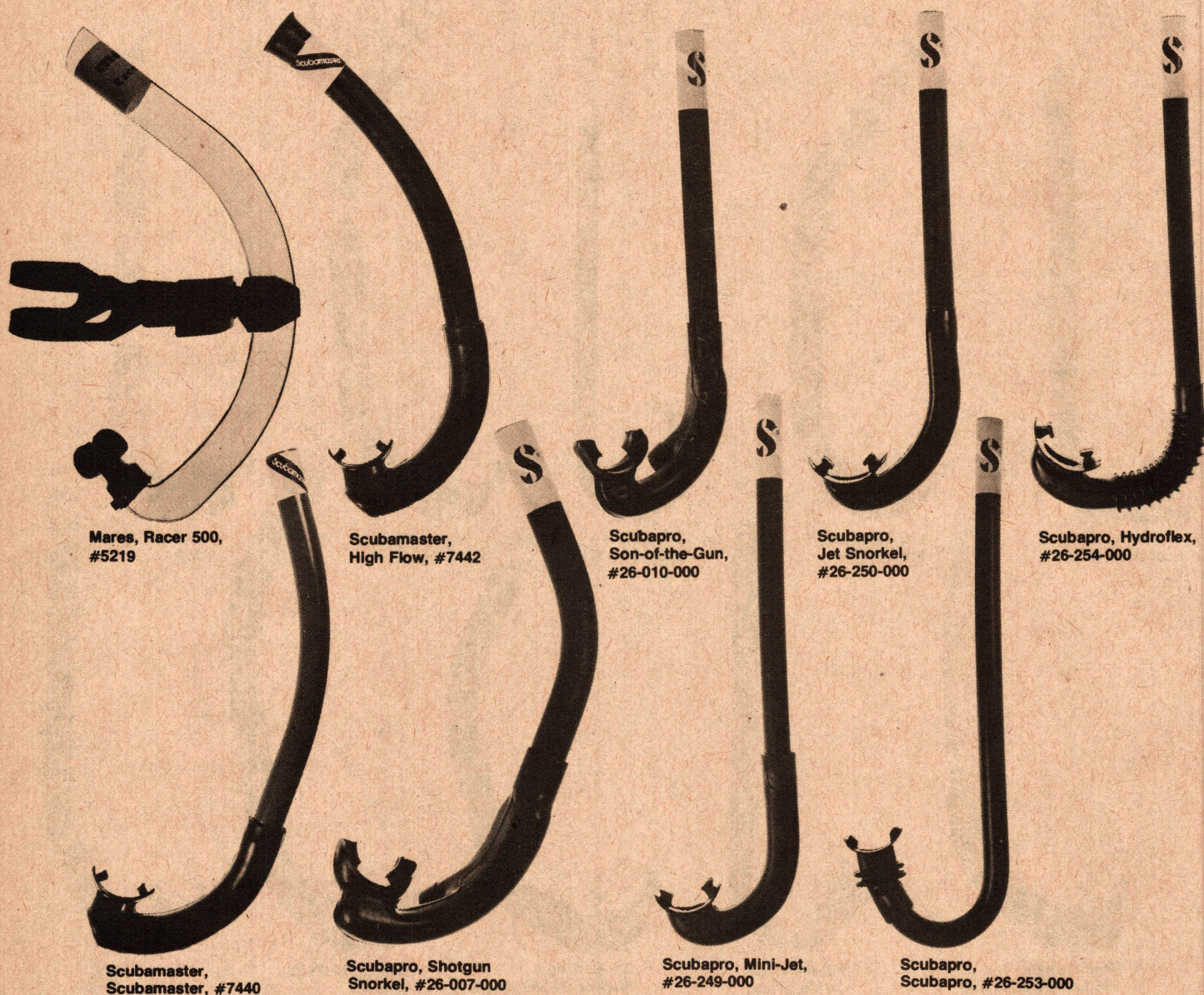
Dive equipment designers have spent a lot of time researching the optimum in-

side diameter of the snorkel tube. It has been found that snorkels with a large bore (inside diameter) provide maximum ease in obtaining large volumes of air. What size diameter snorkel should you buy? Most divers *should* use a large bore snorkel. Anyone who swims under rugged dive conditions, such as heavy surf or long distances from shore, should use a large bore. A scuba diver who is likely to surface far from the boat or shore with an empty tank needs a big bore. The small bore snorkel is only acceptable in situations where the dive conditions require very little exertion in calm, shallow waters. Over 50 percent of the snorkels

on the market are big bore (19mm to 21mm) which indicates a gradual evolution toward a wide, short barrel providing a maximum amount of air when inhaling, and a minimal amount of resistance when exhaling.

Describing the shape of a barrel may be a question of semantics among manufacturers, but basically there are three types: Straight, angled and wraparound. As the name implies, the straight barrel is a long straight tube. Because the top and bottom portions of its barrel are positioned far from the curvature of the diver's head, there is considerable wobble and drag when the diver is moving for-

SNORKEL roundup



ward through the water. An angled barrel is bent slightly at the lower portion of the unit so that it fits closer to the face, and continues upward in a straight line alongside the diver's head. This type of barrel helps to reduce the amount of flutter and vibration in the lower end of the snorkel. Wraparound barrels are angled both at the top and bottom of the barrel to closely follow the contour of the diver's head. The wraparound reduces the amount of drag, wobble and vibration, both above the water and below. The streamlined configuration of the wraparound snorkel is the most desirable model, and it is rapidly becoming the most popular.

Aquamax recently introduced a snorkel

barrel that is a significant design departure from the common types described above. Perched on top of the Aquamax is a three inch long, two inch diameter plastic cap, which is screwed over the large threads on the snorkel barrel. When submerged, the cap and the threads trap the air and prevent water from entering the tube. While the scuba diver may find the inverted cup-like top causes drag, the occasional snorkeler will be delighted to find a snorkel that breathes dry, even when dipped below the surface.

Another barrel design variation is the flair. The end of the barrel is shaped like a funnel, or bell. The flared end tends to di-

rect incoming and outgoing air and subsequently reduces air turbulence. Manufacturers claim their bench tests indicate a diver can improve breathing efficiency up to 18 percent with this type of barrel.

MOUTHPIECE TUBE

The tube which holds the mouthpiece to the barrel may be an extension of the barrel or a separate unit. The shape of this elbow forms the shape of the snorkel and usually describes the snorkel's design. There are four different types which include: The J shape; the L shape; the flexible snorkel; and the contour snorkel.

The traditional J shaped snorkel was very popular in the 1950's and 1960's,



Scubapro, Wraparound Jet, #26-257-000



Selpac, Corsica, #SSN-714



Sportsways, Malibu Big Barrel, #1615



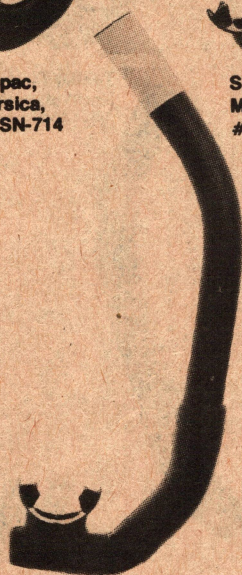
Sportsways, Dolphin, Jr. Swivel, #1624



Sub-Aquatic, Swivel Snorkel, #2050



Scubapro, Off-Set Jet, #26-258-000



Selpac, Divemaster, #SSN-716



Sportsways, Flex-O-Wrap, #1619



Sportsways, The Competitor, #1625

and is still popular today. Many of those early models had a deep J that increased the length up to six inches. Not only did it increase drag (below the chin), but had an additional dead-air space. The long loop of the J was gradually modified and reduced to the extent that the sharp bend resembled the letter L, hence the name. The L shape improved the snorkel considerably. It reduced dead air space, drag, and vibration and it reduced the possibility of trapping water in the low end of the J curvature.

The flexible type of snorkel is made of corrugated rubber hose. Some scuba divers prefer this type of snorkel because the mouthpiece conveniently drops

down out of the way when not in use. In the early years of diving the flexible hose was popular but had several problems. The hoses were too thin and bent under the pressure caused by the forward momentum of the swimming diver. Most hoses today are, however, more rigidly constructed and so are advertised as non-collapsible. Another problem encountered with flexible type snorkels is that water tends to become trapped in the grooves of the corrugations, causing spray or mist on inhalation. Manufacturers such as Dacor have alleviated the problem by using tubing that is corrugated outside, but smooth inside.

The contoured snorkel is considered to

be a modified version of the L design. There are several advantages to this design. First, the gradual curvature of the mouthpiece to the barrel eliminates any sharp bends, and therefore reduces air turbulence. Equally important is that the contoured elbow fits close to the face, and reduces the amount of drag and flutter in the lower end of the snorkel. This streamlined configuration has proven to be extremely comfortable, easier to clear of water, and reduces drag to an absolute minimum.

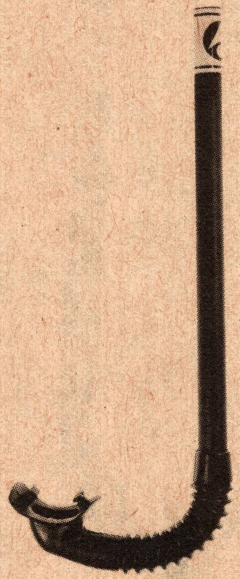
THE MOUTHPIECE

Although not always apparent, the most critical portion of the design in any

SNORKEL roundup



Sub-Aquatic,
Large Bore Swivel,
#2052



Tabata, Tropicana,
#SR-66



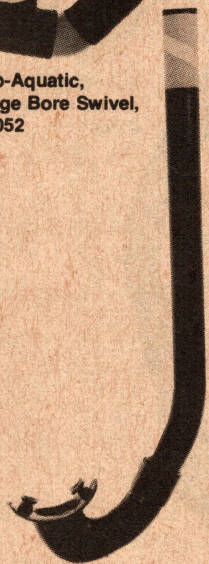
Tabata, Samoa
Snorkel, #SR-140



Tekna, Tube Tab
Snorkel, Swivel,
#T-1400



U.S. Nemrod,
Iron, #6006



Tabata, Pro Swivel,
#SP-4



Tabata, Tonga,
#SR-101



Tabata, Adrian Rubber,
#SR-150



Tekna, Tube Tab
Snorkel, Swivel,
#T-1500

snorkel is the mouthpiece. It is the mouthpiece which eventually determines whether you are going to enjoy dry, comfortable surface breathing or a constant gurgle and spray that is nearly impossible to eliminate. In turn, the key to mouthpiece design is fit.

When it comes to barrel shapes, bore diameters, contours and curves, it is fairly easy to make recommendations — but the mouthpiece is an entirely different matter. There is no such thing as the best mouthpiece design since everyone's mouth has a different shape, size, and type of bite. It is only through personal experimentation that a snorkeler can determine which mouthpiece fits best. In

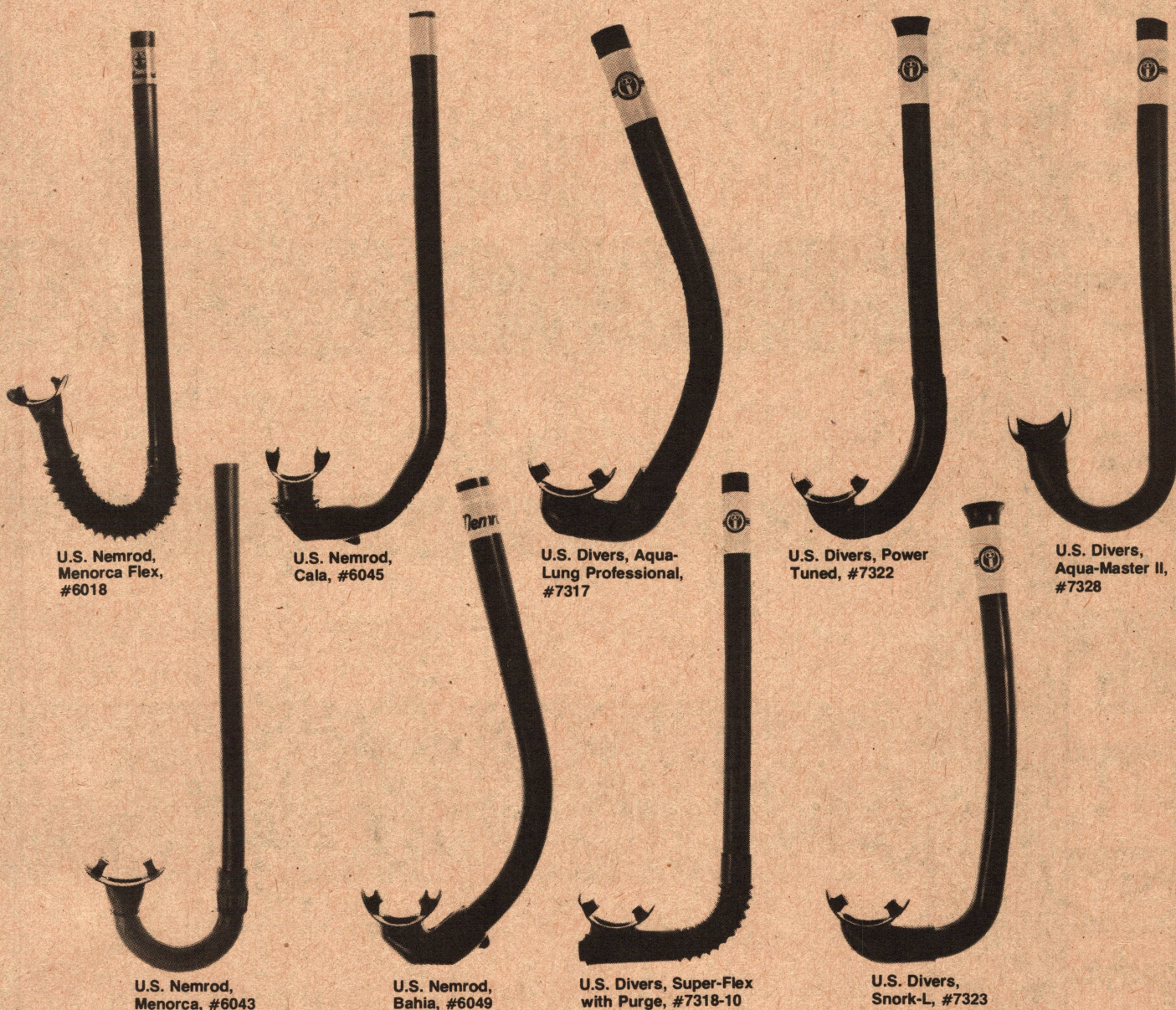
some cases, mouthpiece fit becomes the overriding factor in the eventual choice.

There are basically four types of mouthpiece designs for snorkels: Oval biteplate; solid lugs; tubular lugs; and moldable lugs. Mouthpieces come in different sizes, materials, and degrees of flexibility. There are many different features to consider, but the primary consideration should be personal comfort.

The mouthpiece consists of a rubber flange which fits in front of the teeth and behind the lips, plus a biting surface (usually two lugs, or bits) and an air hole for breathing. One of the first things to check is the diameter of the orifice in the mouthpiece. It should be equal to the

bore diameter of the barrel. For the smoothest flow of air, the mouthpiece tube should have the exact same bore size as the barrel.

The full oval biteplate design was popular in the 1950's and 1960's, but few are made today. The biggest disadvantage to this type of bite surface was that your teeth were blocked from covering the air hole. The teeth serve as a final barrier for stopping any spray from hitting the back of the throat, which can cause spasms and choking. Aside from that problem, the early models were extremely rigid and uncomfortable to use for any length of time. AMF Swimaster has solved this problem by making an extremely com-



portable mouthpiece that is small in size and cushioned with neoprene.

The most common mouthpiece consists of two standard lugs, or bite pieces, similar to those on the mouthpiece of a regulator. It comes in a wide variety of sizes and shapes, and the only way to find the right one is to try all the various ones on. The flange should fit easily under the lips without irritating or cutting the gums, but should not be so small that it is difficult to form a watertight seal around the outside edge. When the snorkel is held in the mouth, the teeth should grip the lugs or nubs without stress on the jaw. Be sure that the bite pieces are comfortably matched to your particular den-

tal features.

Another type of mouthpiece design is the tubular lug model manufactured by Tekna. The bite pieces are hollow oval tabs that collapse and conform to the teeth. The tabs are very resilient and give under slight pressure, alleviating the problem of jaw fatigue.

The moldable mouthpiece snorkel, produced by Farallon, is a custom fitted mouthpiece which conforms exactly to the bite-print of your teeth. Whether you have a normal dental structure or one that is similar to Dracula, you may find the moldable mouthpiece more comfortable than the standard lugs.

There are several other factors which

you might want to consider when shopping for a mouthpiece. For example, some snorkel mouthpieces are angled at 30 degrees from the barrel, and are used only on the left side of the head. If you like to wear your snorkel on the right, then this is not the snorkel for you.

A feature that has gained great popularity over the past few years is the rotating mouthpiece. This design has a swivel connection between the barrel and tube or tube and mouthpiece. The diver can then align the mouthpiece to any angle (360 degrees) for a better fit.

There are a few models which offer a purge valve in the mouthpiece section to help eliminate those last few drops of

SNORKEL ROUNDUP

MANUFACTURER/ MODEL NAME	MODEL NUMBER	MOUTHPIECE SHAPE	BARREL DESIGN	BORE SIZE (Millimeters)	LENGTH (Inches)	MOUTHPIECE TYPE	RETAIL PRICE	NOTES/ OTHER FEATURES
AMF SWIMMASTER Spearfisherman Bello-Flex Avalon Avalon F6 F7 F8	2520 2530 2555 2560 F6 F7 F8	L Flexible-L Contour Contour J J L	Straight Straight Wraparound Wraparound Straight Straight Wraparound	20 18 21 21 13 19 21	14 13 14 14 14-16 12-14 12	Std lugs Std lugs Std lugs Std lugs Oval Std lugs Std lugs	\$ 7.00 7.50 16.00 17.00 4.90 4.30 9.00	Large barrel Standard flex Swivel mouthpiece — flare top barrel Swivel, gum rubber mouthpiece Small, one piece mouthpiece Plastic barrel Large barrel
AQUAMAX Aquamax		Contour	Straight	17	14	Std lugs	\$12.95	Cap on top keeps water out
CRESSI-SUB Gringo Defino Arcusa Bellows Professional	650 651 653 655	Contour J Flexible-J Contour	Angled Straight Straight Wraparound	17 19 19 19	13 12 13 13	Std lugs Std lugs Std lugs Std lugs	\$ 5.90 3.90 7.95 7.95	Double bend elbow Plastic barrel Convolutional hose Available in clear, black, yellow
OACOR Universal L-Shaped Spiral-Flex Spiral-Flex Standard Economy Big Barrel Turbo Contoured Turbo Straight Turbo-Flex Contoured Turbo-Flex Straight	UST LST RST FST EST PST GST TBT TST NBT NST	J L Flexible-J Flexible-J L L L Contour Contour Flexible-Contour Flexible-Contour	Straight Straight Straight Straight Straight Straight Wraparound Wraparound Straight Wraparound Straight	17 17 13 13 13 12 21 20 20 20 20	14-16 16 14-16 14-16 15 15 12 12 14 14 15 15	Std lugs Std lugs Std lugs Std lugs Oval Std lugs Std lugs Std lugs Std lugs Std lugs Std lugs Std lugs	\$ 6.00 6.00 6.00 6.50 4.50 3.50 9.00 9.00 9.00 9.00 9.00 9.00	Standard design Standard design Non-crimping hose Non-crimping hose Plastic barrel Plastic barrel Clear, high impact plastic barrel Swivel mouthpiece Swivel mouthpiece Low convolution hose, swivel mouthpiece Low convolution hose, swivel mouthpiece
FARALLON/OCEANIC Moldable Snorkel Moldable Snorkel Moldable Mouthpiece w/Swivel Moldable Mouthpiece w/Swivel	07-1004 07-1005 07-1006 07-1007	Contour Contour Contour Contour	Wraparound Wraparound Wraparound Wraparound	21 21 21 21	13 13 14 13	Moldable Moldable Moldable Moldable	\$ 8.50 8.50 11.50 11.50	Regular size moldable mouthpiece Small moldable mouthpiece Swivel mouthpiece Small, swivel mouthpiece
HEALTHWAYS ScubaDiver ScubaFlex Scubamaster	1420 1437 1440	Contour Flexible-L Contour	Straight Straight Wraparound	18 18 21	14 13 15	Std lugs Oval Std lugs	\$ 5.50 5.90 7.95	Plastic barrel Barrel orange plastic, mouthpiece angled 30°—left side only
INTERNATIONAL DIVERS, INC. Blowhole Pro Blowhole Flex Plastic Snorkel Blowhole Pacifier	1779 1781 1782 1783	Contour J J Contour	Wraparound Straight Straight Wraparound	21 17 17 21	13 15 14 13	Std lugs Std lugs Std lugs Std lugs	\$ 7.80 5.60 2.60 9.80	Popular design Standard J model Plastic barrel Swivel mouthpiece
MARES Big "J" Big "C" Little "C" Sport Diver Racer 500	5202 5204 5205 5215-5217 5219	Contour Contour Contour Contour Contour	Straight Wraparound Wraparound Angled Wraparound	21 21 21 19 Triangular	15 14 14 13 13	Std lugs Std lugs Std lugs Std lugs Std lugs	\$ 7.00 8.95 8.95 4.00 12.00	Swivel mouthpiece Swivel mouthpiece Small mouthpiece Yellow, black or orange—small Racing snorkel, front mount

SCUBAMASTER The Blue Snorkel The High Flow	7440 7442	Contour Contour	Wraparound Wraparound	21 21	15 14	Sid lugs Sid lugs	\$ 8.00 9.50	30° angle, left side only Flare top, 30° angle for left side
SCUBAPRO Shotgun Son of the Gun Mini-Jet Jet Snorkel Scubapro Snorkel Hydroflex Wraparound Jet Off-Set Jet	26-007-000 26-010-000 26-249-000 26-250-000 26-253-000 26-254-000 26-257-000 26-258-000	Contour Contour Contour Contour J Flexible-L Contour Contour	Wraparound Straight Straight Straight Straight Wraparound Wraparound	21 19 15 18 17 15 21 21	13 13 14 14 14 15 14 14	Sid lugs Sid lugs Sid lugs Sid lugs Sid lugs Sid lugs Sid lugs Sid lugs	\$13.00 12.00 7.50 8.50 7.50 7.50 10.00 11.50	2 barrels, self draining purge Small mouthpiece Small mouthpiece Popular design Basic J, small mouthpiece Small mouthpiece Large bore Mouthpiece at 30° angle, left side only
SELPAC Corsica DiveMaster	SSN-714 SSN-716	Contour Contour	Angled Wraparound	17 21	13 13	Sid lugs Sid lugs	\$ 3.50 9.50	Swivel mouthpiece Swivel mouthpiece, large bore
SPORTSWAYS Malibu Big Barrel Flex-O-Wrap Dolphin Jr. The Competitor	1615 1619 1624 1625	Contour Contour Contour Contour	Angled Wraparound Angled Wraparound	21 21 17 20	15 14 13 13	Sid lugs Sid lugs Sid lugs Sid lugs	\$ 8.50 8.50 5.25 12.00	Large bore Large bore Swivel mouthpiece Swivel mouthpiece, big bore
SUB-AQUATIC Swivel Snorkel Large Bore Snorkel	2050 2052	Contour Contour	Angled Wraparound	17 21	13 13	Sid lugs Sid lugs	\$ 7.00 10.00	Swivel mouthpiece Swivel mouthpiece
TABATA Pro Swivel Tropicana Tonga Samoa Adrian	SP-4 SR-66 SR-101 SR-140 SR-150	Contour Flexible-L Contour L Contour	Angled Straight Straight Wraparound Wraparound	17 15 18 20 21	13 14 14 13 13	Sid lugs Sid lugs Sid lugs Sid lugs Sid lugs	\$ 3.60 5.00 6.00 8.00 7.50	Swivel mouthpiece Small bore Medium size barrel Swivel mouthpiece, purge valve Swivel mouthpiece, large bore
TEKNA Tube Tab w/Swivel—regular Tube Tab w/Swivel—small	T-1400 T-1500	Contour Contour	Wraparound Wraparound	21 21	13 13	Hollow tabs Hollow tabs	\$ 8.50 8.50	Swivel mouthpiece, large bore Small, swivel mouthpiece
U.S. DIVERS Aqua-Flex Aqua-Lung Professional Super-Flex Super-Flex w/Purge Power Tuned Snork-L Aqua-Master II	7313 7317 7318 7318-10 7322 7323 7328	Flexible-J Contour Flexible-L Flexible-L Contour L J	Straight Wraparound Straight Straight Straight Straight Straight	19 21 19 19 19 19 19	13 13 15 15 14 13 14	Sid lugs Sid lugs Sid lugs Sid lugs Sid lugs Sid lugs Full	\$ 9.00 11.00 10.00 11.00 11.00 11.00 7.00	Corrugated mouthpiece tube Yellow or black, large bore, plastic Convuluted, non-kinking hose Convuluted, non-kinking hose Flare top barrel Swivel mouthpiece, flare top Standard model, one piece
U.S. NEWROD Iron Menorca Flex Menorca Cala Bahia	6006 6018 6043 6045 6049	Contour Flexible-J J L Contour	Wraparound Straight Straight Angled Wraparound	21 18 18 17 22	14 16 15 16 13	Sid lugs Sid lugs Sid lugs Sid lugs Sid lugs	\$ 9.00 8.70 6.70 7.00 5.80	Large bore Standard flex Soft rubber, lightweight Small mouthpiece Large bore, lightweight
WHITE STAG Deep Dive Big Tube Deep Plastic Tube Translucent Hydro-Stream Silicone Hydro-Stream Adjustable Hydro-Stream Standard Dolphin, Jr.	52910 52911 52913 52915 52940 52941 52971	Contour Contour Contour Contour Contour Contour L	Wraparound Wraparound Wraparound Wraparound Wraparound Straight Straight	21 21 21 21 21 21 15	14 15 15 15 15 16 13	Sid lugs Sid lugs Sid lugs Sid lugs Sid lugs Sid lugs Sid lugs	\$ 9.00 7.00 15.00 12.75 9.00 9.00 3.75	Large bore Clear barrel, black mouthpiece Clear barrel, silicone mouthpiece Silicone mouthpiece Swivel mouthpiece, large bore Swivel mouthpiece, large bore Small mouthpiece

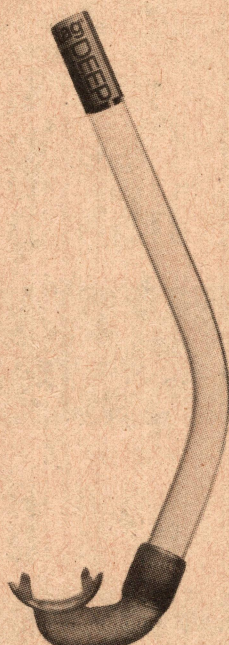
SNORKEL roundup



U.S. Divers,
Super-Flex, #7318



White Stag, Deep
Dive, #52910



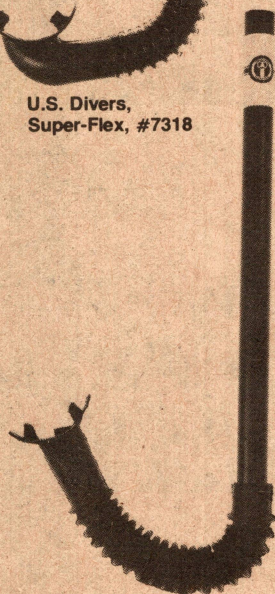
White Stag,
Translucent, #52913



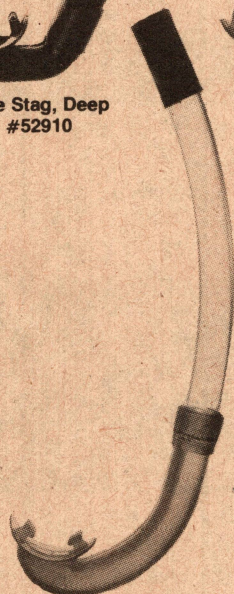
White Stag, Hydro-
Stream Adjustable,
#52940



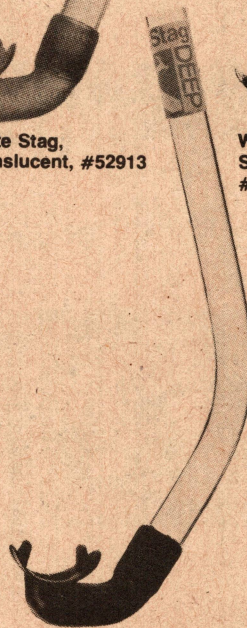
White Stag,
Dolphin, #52971



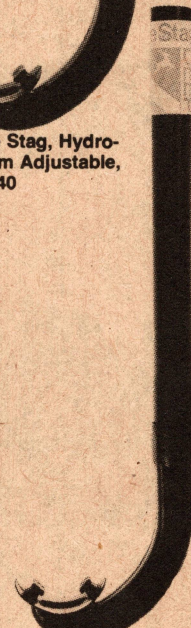
U.S. Divers,
Aqua-Flex, #7313



White Stag, Deep
Plastic Tube, #52911



White Stag, Hydro-
Stream Silicone, #52915



White Stag, Hydro-
Stream, #52941

water that may remain in the tube. One unique variation of that concept is Scubapro's Shotgun Snorkel, which is designed with a purge-valve extension near the mouthpiece. The extension is a small, separate barrel that starts to drain water through the purge as the snorkel breaks the surface. Less effort is required to clear the snorkel and any water that runs back into the barrel is caught in the secondary chamber.

As time goes on, there will be more innovations and developments geared toward a more comfortable mouthpiece that does not chafe, irritate, or cause fatigue. Different types of rubber compounds will be tried to offer a solid but resilient mouthpiece for maximum comfort.

For example, AMF Swimaster has recently introduced a pure gum rubber mouthpiece and White Stag offers a hypoallergenic silicone rubber mouthpiece.

CONCLUSION

Selecting a snorkel that is comfortable, dry and breathes easily is the name of the game. Look for a soft rubber mouthpiece that is easy to grip. Test and compare several models in the water to be sure you have one that is the right size for your mouth. Does your snorkel always seem to gurgle with water no matter what you do to clear it? It may be that your lips are not forming a watertight seal around the flange because the mouthpiece does not fit properly. The snorkel should sit

squarely in the mouth without your clamping down hard. Swivel type designs make it easy to position the snorkel at any angle and provide maximum comfort. Unless you are only paddling around in the shallows, avoid long, skinny snorkels. An easy breathing snorkel will have a large bore size and simple lines with gentle curves. A small bore snorkel will not deliver enough air at the time you need it the most. Sharp bends will add air turbulence, collect CO₂ and can be difficult to clear.

The snorkel is a necessary and fundamental piece of gear. If you're unhappy with your present one, take faith, because somewhere out there is a snorkel which is perfect for you. »

SDM travel

SECTION

The nervous mackerel shot between us, his three foot length flashing silver in the sun's shifting rays. The second pass brought him closer; my strobe caught him, once, then again as he turned. He shook himself and whizzed back by, away from the steep, coral-encrusted wall. As we moved to follow, a second, larger shape entered our vision a 150 feet away — shark! The five foot blacktip quickly closed the distance and came in, eyeing us with obvious curiosity. John lay suspended just below Melanie and me, at 80 feet. The shark passed him first and was momentarily lit by a strobe flash. I quickly moved downward to meet the sleek animal, his dark pupil fixed in a cold stare. My motordrive whirled in the quiet deep.

The large fish slowed only slightly, then angled swiftly away, down the rough wall. We followed him out from the reef, swimming hard to keep his bulk in our viewfinders. At 100 feet, a second shark streaked into view, turned, and cut by us with a burst of speed. An electric-like bolt of pure excitement swept through the water like a current; we could sense the anxiety that hung so heavily over us. At 120 feet, another shark closed in from a different direction. A fourth, fifth, and then an additional pair sped into view, shaking their tails and fins in rippling shudders of agitation. As the adrenalin roared through us, the water burst into shimmering silver as two 110 pound bonita exploded onto the scene. The quiet blue of deep ocean turned electric as strobe flashes and the sun's rays glimmered blindingly off polished scales, our eyes dazzled by the lightning from 1000 living mirrors.

For five trance-like minutes we hung surrounded by the animate maelstrom, sharks and bonita scarcely aware of us as they performed the frenzied rites of survival. Then, just as quickly, it was over; the three of us once again left alone in the heart of the sea. Empty cameras, pressure gauges showing

PALAU DIARY

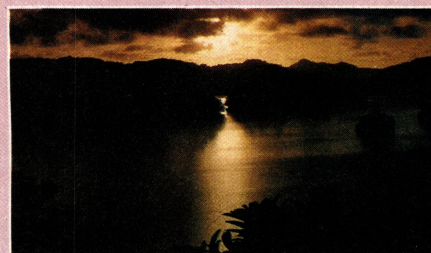
TEXT AND PHOTOGRAPHY
BY AL HORNSBY



Formed by fitful coral growth on shifting volcanic peaks, Palau is a beautiful maze of 349 jungle-coated islands strung over 20,000 square miles of sparkling ocean.

nearly spent air supplies, and thudding hearts were the sole remains of what could have been a dream, or just imagination.

It had started the week before, as the plane eased down over the scattered jewels that are the islands of Palau. In the southwestern Pacific, just 400 miles north of the equator, the Palauan archi-



pelago lies strung over 20,000 square miles of sparkling, 84°F ocean. The unique beauty is at once both soothing and staggering, with that special mix of tropic green and ocean turquoise. Formed by intermittent coral growth on shifting volcanic peaks, a beautiful maze of 349 jungle-coated islands have been created. Though some are large, many of

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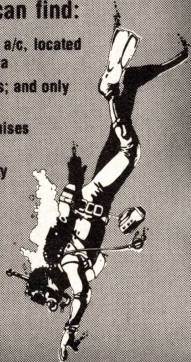
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PALAU DIARY

these limestone structures are but small, mushroom-shaped rocks that rise straight up from the water; their bases eaten away by wave action and shellfish, their bulk rich with a thick covering of wild vegetation.

For the diver, the entire island group is virtually surrounded by fringing and patch reefs that are thought to be one of the possible birthplaces of Pacific reef evolution. The drop-offs, lagoons and channels of this huge area are teeming with fish-life, mollusks, corals, and marine reptiles. Visibilities up to 200 feet maximize the dive experience. These waters are so prolific that Palau has over 300 species of corals — more than twice the number in the entire Caribbean.

Landing on the largest of the islands, Babelthup, we then traveled to the secluded Continental Hotel on Koror. Our dive guide, Francis Toribiong of the Fish and Fins Ltd. dive store, met us that evening and helped plan the week's diving. After a rich sunset and a comfortable night, we woke to begin the fantasy that is diving Palau.

NGEMILIS—THE BLUE HOLES

A white-hot sun glimmers erratically as we fly over a glassy sea. Our boatman steers us through tight clusters of rock islands; we thoroughly enjoy the hour of breathtaking morning scenery between the hotel and Ngemilis, the Great Reef.

Ahead, the top of the barrier reef is flat and nearly awash; brown corals thick under the smooth water. Then, scattered across the reef top, we can see four irregular splotches of dark blue, deep holes that sink into the limestone. With much anticipation, we ready ourselves for a memorable dive.

The vertical tunnel is 30 feet wide, the steep sides alive with marine growth. Richly colored gorgonians extend quivering fingers outward, and brilliant, soft coral trees stand in shades of red, yellow, and vibrant orange. We sink slowly down through schooling baitfish, past deep crevices alive with hatchetfish and big-eyes.

Below us, the scene again grows brighter, and a dog-leg turn at 90 feet opens outward onto a sheer, life-covered wall which tumbles away to over 1000 feet. Several reef whitetips lift off the tunnel bottom where they have been resting, and disappear into the depths. We pause for a last look upward; our boat floats far above, a small eye in a circle of brilliant light.

WONDER CHANNEL

We splash into bathtub-warm water

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beside the shallow reef top. A steady one knot current moves us gently toward the narrow gap between two rock islands. Our last surface sounds are the sharp cries of wheeling terns over the nearby treetops.

A jumble of *Acropora*, fire coral, starts in five feet of water at the edge of the 80 foot deep channel. Clouds of damselfish dart in and out of the crevices, and clownfish brightly squirm in hosting anemones. As we drift, we pass an incredible array of coral species, both stony and soft varieties. Crinoids sit perched atop every prominence, delicate arms sway as they filter the moving waters.

Ahead of us a small hawksbill turtle sleeps complacently on a coral head. When I reach and pick him up, he flaps powerful flippers for a moment, then lies still, studying me with an only slightly apprehensive eye. After several pictures, he is freed to fly quickly away.

At the narrowest part of the channel cut, we swim the shallows to the underhang of the mushroom island. Several *histrion* cowries crawl on the rocky face, cone shells and others lie scattered about. Closely packed two foot high arms of delicate, violet soft coral crowd the walls of a room-sized depression between jutting rocks, a fairyland of color before our eyes.

SIAS FAR WALL

Having angled southwestward from Koror nearly 20 miles, we anchor on the outer reefline of Sias Wall, bordering the Philippine Sea. Again we had asked to film sharks; our first sight underwater is seven reef whitetips grouped on the bottom at 80 feet. We approach quietly but they lift off and move away. A six footer slides over the edge of the wall and passes very near. My camera fires twice before he is gone.

A trail of bright blue and yellow meanders above us as a school of Van Gogh fusiliers slowly passes up the reefline. A hawksbill turtle swims serenely through them, becoming a graceful silhouette, a pirouetting dancer with a garland of fish.

A moment more and the vista is halved by a moving wall of silver. Hundreds of two foot barracuda turn tightly, nearly touching. Fin-to-fin, their blackened stripes create zig-zag patterns with the motion. We pause, again astonished and delighted by the sea.

ULONG ISLAND/ULONG CHANNEL

After a leisurely lunch, we motor due west to the inside of Ulong Channel. We are miles from land, moving water stretching away in all directions. To the east, a ribbon of elongated cloud snakes along a green island-studded horizon, the only clouds in a cobalt sky.

(Continued on Page 54)

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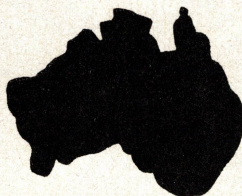
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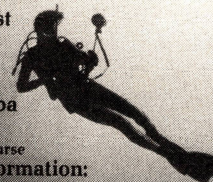
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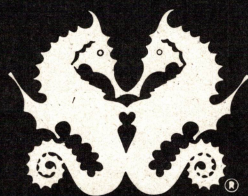
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PALAU DIARY (Continued from Page 51)

The dive is a drift on a healthy three knot current sweeping through Ulong with the tide. We enter and move down a smooth slope to the bottom at 50 feet. The U-shaped trough is 50 yards across, with massive coral heads jutting here and there from the thick sand.

Immediately, there is commotion. Two, 20 pound crevalle jack approach quickly from up-current, to swing in close without slowing. A school of large snappers, 80 strong, feeds with purpose as we sail past. We settle to the bottom to photograph — Melanie points suddenly. I turn to see the six foot blacktip coming straight to us. He closes to three feet and stops. We stare nose to nose for a long minute; his eye is silver with a black-slit pupil, his mouth a thin dark slash under a dead white snout. As suddenly, he turns and disappears downstream.

We drift over colonies of soft corals, the most colorful we have seen. Purples, reds, and yellows abound; spread branches reaching into the quickly moving current.

LIGHTHOUSE CHANNEL: AFTER NIGHTFALL

At ten pm we slip into the pitch-dark water. The current is brisk, but not difficult. We sink to a 60 foot sand and coral bottom. With lights out, only a few minutes pass before our eyes adjust to the heavy but breachable gloom.

Our flashlights again stab back out into the darkness. Almost immediately we are surrounded by thousands of dancing, red-brown worms attracted by the glow. Furrowed trails criss-cross the bottom — a wave of the hand reveals *Mitra mitra*, the Episcopal miter; *Conus aulicus*, a beautiful cone shell; and *Harpa costata*, the imperial harp.

I spot a small eye and gently scoop up a tiny, four inch cuttlefish. He rests easily in my hand, seemingly content and unafraid. After a few moments we part.

John and I move over a rough, coral-crusted bottom. The light sweeps left to right; there, a glint of polish. I rush to marvel at the beauty of the cowrie, *Mappa*.

John swings his light in signal and I move to look — a six inch knife-blade of fish we have never seen hovers unmoving in the beam's glare. His tiny heart beats wildly as we gaze — he is perfectly transparent, from gills to pointed tail.

As we ride beneath the sky back to Koror, we are quiet, bathed in the warmth of memory. Tomorrow we are to leave these beautiful islands and those many splendid dives. But for now, we sit gazing at the Southern Cross tilted on the horizon, a warm tropic breeze in our faces. There is magic in the night.

COUSTEAU TO ST. CROIX

Captain Jacques-Yves Cousteau has chosen St. Croix as the site for the filming of U.S. Divers' 1981 catalog of professional dive equipment. Larry Angus,



owner of Caribbean Sea Adventures, made arrangements for the filming. The largest dive and water sports operation on the island, Caribbean Sea Adventures is also the sole distributor for U.S. Divers on St. Croix. »

SEE & SEA TO MALDIVES

See & Sea Travel has scheduled its third year of Maldives Islands/Sri Lanka programs with a September 5-21 gala escorted by Carl Roessler. This group



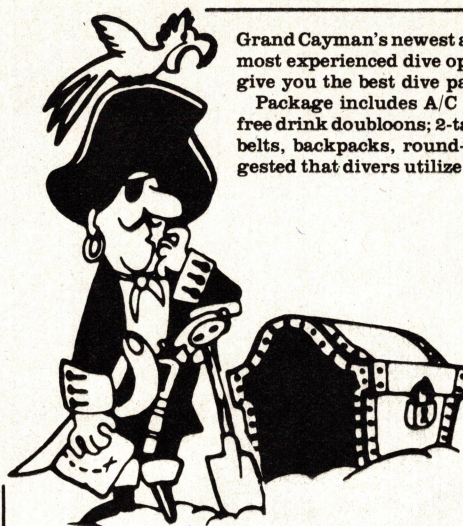
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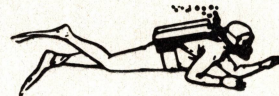
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CAYMAN'S PIRATES WEEK

Visitors to the Cayman Islands during Pirates Week, the British Crown Colony's national festival, October 25-November 1, will be able to take advantage of special Treasure Chest vacation packages.

Events include land and, for certified divers, underwater treasure hunts with thousands of dollars worth of prizes;



photo competitions; District Days with special events all over the islands; and gala parties and balls when the ruffians are put out to sea at festival's end.

Thirteen properties are participating in the Pirates Week Treasure Chest program, with seven day/six night packages from \$135, and four day/three night packages from \$82.50. All packages include room with private bath, complimentary black coral pendant, glass bottom boat trip, admission to the Cayman Turtle Farm, a bottle of wine and a ten percent discount on purchases at Soto's Three Freeport Shops, The Viking Gallery and the Red Rabbit Deli.

For brochures detailing the special events, including lunch and dinner cruises aboard the *Queen Anne's Revenge*, a full-size pirate vessel, and Pirates Week packages, contact your Cayman Islands Dept. of Tourism.

DIVE MEDICINE IN DEPTH

An advanced Diving Medicine In Depth (DMD) will be conducted November 1-8 by Human Underwater Biology, at the Riding Rock Inn, San Salvador Island, Bahamas.

The program is designed to present state-of-the-art information on selected topics in the field of dive medicine. It carries a prerequisite of previous attendance at a basic course of instruction in dive medicine.

DMD is approved for Category I Continuing Medical Education Credits by the American Medical Association through the Undersea Medical Society. A brochure and information can be obtained by writing: Program Coordinator, Human Underwater Biology, Department 1250, Box 5893, San Antonio, TX 78201.

POSEIDON TO AUSTRALIA/TAHITI

Poseidon Ventures has two departures for Australia (Great Barrier Reef) and Tahiti diving. The October 11 departure will be led by Paul Schutt of Helix, Chicago, who will offer U/W photography hints and techniques. The November 3, 1980 departure will be led by Ken Davis of Sub Aquatics, Reynoldsburg, Ohio.

Both trips will feature diving with Dive Australia, from large live aboard vessels cruising the Great Barrier Reef from Cairns, Australia, and stops in Tahiti with varied options.

Poseidon Venture Tours and John the Diver of Springfield, Missouri will conduct a deluxe dive venture to the Coral Sea, Australia. The tour will feature ten days of unlimited diving from a Dive in Australia vessel to the Coral Sea, returning to Lizard Island. The tour will depart in early December 1980.

For information contact Poseidon Ventures Tours, 359 San Miguel Dr., Newport Beach, CA 92660. 🐠

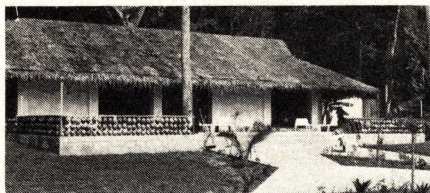
RUNAWAY BAY, JAMAICA

New, all-inclusive 4 day/3 night and 8 day/7 night package tours to Runaway Bay, Jamaica, featuring some of the best diving in the Caribbean, are being offered through December 15. Air Jamaica is the carrier.

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BOKISSA ISLAND

Bokissa Island, four miles south of Santo, is one of the most beautiful coral islands in the New Hebrides. The island was purchased a few years ago by a group of Australian businessmen and is



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Bokissa is located on a 165 acre coral atoll and has a private white sand beach. Except for resort staff and guests, no one else lives on the island. Guests at the resort are housed in thatched huts that are

constructed among the palm trees. Inside, modern motel comforts and conveniences are provided. The main complex includes a restaurant which overlooks the largest swimming pool in the New Hebrides and beyond that, the sea. Write: Mr. M. John, 51 Bull St., Bendigo, 3550, Bokissa Island. 🐠

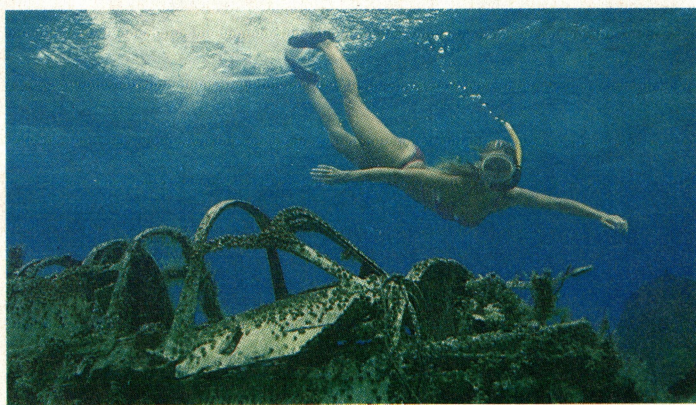
SANDER BACK AT BUCCANEER'S

Dick Sander has returned to the Buccaneer's Inn, Cayman Brac, as general manager. Sander worked for the Buccaneer's for several years starting in



1973. He has also been a salesman for National Cash Register Company in Jamaica and divemaster and assistant manager of Sunset House on Grand Cayman. 🐠

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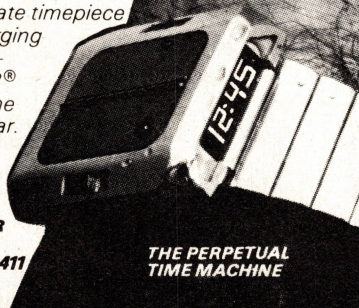
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A highlight of the Los Angeles County Underwater Instructors 28th graduation was the presentation of the safety award to Scubapro for the design and development of the A.I.R. II regulator. It was the



Mike Brock with safety award.

first time this award was presented to a dive manufacturer and not an individual. Receiving the award was Scubapro's national sales manager, Mike Brock, and engineer, Jim Dexter.

CLOSE-UPS

(Continued from Page 27)

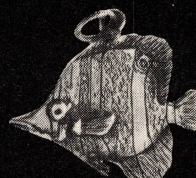
the line for U/W close-up lenses for the Nikonos camera. It offers professional-quality optics that approach (or equal) the optical quality of housed 35mm cameras, but with much less bulk. For close-ups of moving subjects, for example, Jim uses the Nikon Close-Up Outfit with a 28mm lens, and support rod (without the field frame) for aiming. He finds this easier to use (in these situations) than our housed Nikon F cameras.

The Novatek Plus/5 has a built-on focal framer that outlines half the subject area. While this can simplify aiming, the framer can cast a shadow (from your strobe) on the subject, may bump some subject areas, and can't be removed from the lens. The Novatek Plus/2 and Plus/3 lenses have labels showing subject distances and depth of field for four different focused settings. An adjustable wand is available as an aiming aid.

When tested with lens charts underwater, all of the Nikonos close-up lenses discussed had good center sharpness. The biggest differences were in corner

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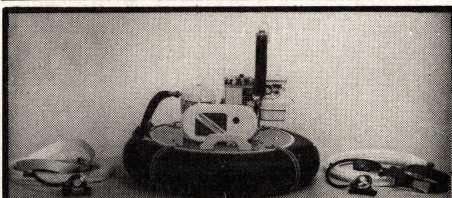


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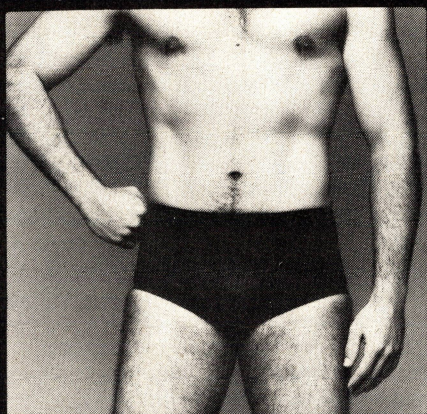
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sharpness and pincushion distortion. The Nikon Close-Up Outfit and Hydro Photo 12-28 had the best corner sharpness and the least distortion. The Micro Lens III showed slight loss of corner sharpness and some distortion. The remaining lenses had a more noticeable loss of corner sharpness and increase in pincushion distortion, and appeared to be approximately equal in optical quality.

With comparison shots of actual U/W subjects, taken on color slide film and projected, differences among lenses are much harder to detect. In our U/W photography courses, many students have been unable to see differences in projected side-by-side images. Because close-ups usually concentrate interest in the central picture area, you could take U/W close-ups for years without noticing lack of corner sharpness or distortion. Unless your goal is to produce large color prints, you can reach diminishing returns in increased optical quality. For the sport photographer, ease of operation and a reasonable price is often the deciding factor. The bottom line is: How much quality do you need, and how much quality can you afford? ➤

CAYMAN CAPER

(Continued from Page 9)

went down, bow first.

To the sound of tooting ships' horns, bells and the cheers of about 125 spectators, the *Oro Verde* disappeared beneath a gush and spurt of water, ending up on her side amid clouds of sand and debris. On the surface, a geyser of trapped air escaping the hold was the only evidence of her ever having been there.

Easily visible from an approaching dive boat, her white hull on the port side is just 20 feet below the surface. In time, she will be transformed from wreck to reef, as the fish find her and the sponges and corals begin to cover her sides and rails. We will spend countless hours diving and photographing the *Verde*; but none who witnessed her baptism will ever forget that moment of transformation, as the derelict nobody wanted became a star that everyone will want to meet. ➤

DIVER RESCUE WORKSHOP

The fifth Sonoma County Diver Rescue Workshop will be held September 27-28, 1980 at the Santa Rosa Junior College in Santa Rosa, California. Persons interested in attending the workshop should contact Mel Cummings, P.O. Box 3967, Santa Rosa, CA 95402.

In addition, the sponsors are accepting applications for staff personnel. Staff training will be September 26. For details contact Rich Peters, 3504 Flintwood Drive, Santa Rosa, CA 95404. ➤



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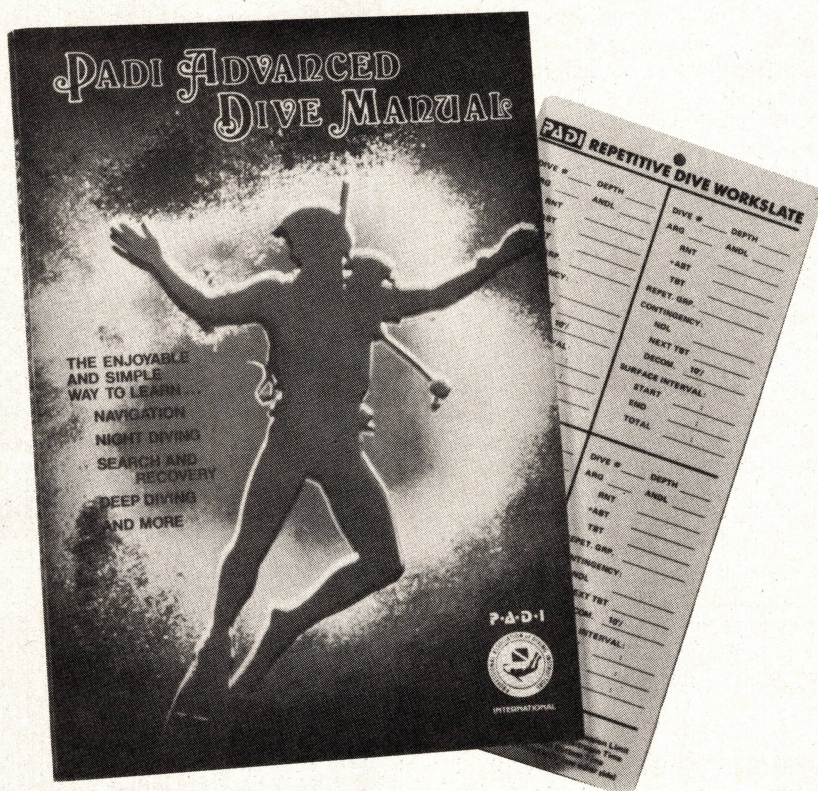
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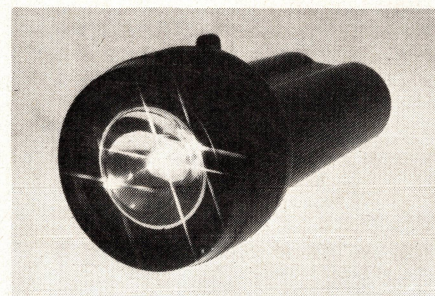
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Ikelite's MiniCLite

TEXT AND PHOTOGRAPHY
BY GEORGE COZENS

A lot can be said for small underwater dive lights. They offer a degree of versatility not found in their larger relatives. Being reasonably compact and fairly lightweight, these little underwater lights can be carried anywhere and used anytime. On night dives, they can be used as the main light source, or, attached to the diver out-of-the-way (on his/her equipment), can be available as emergency back-up lights. They can be mounted on cameras and used as focusing lights U/W (especially helpful when trying to focus a single lens reflex camera with little or no available light);



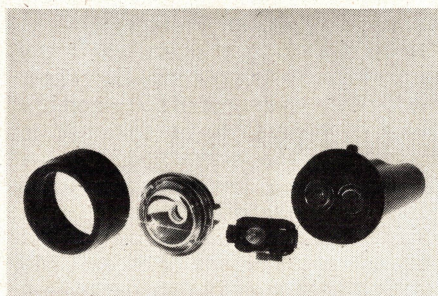
secured to strobes as aiming or modeling lights (to position the strobe and observe how shadows are cast on the subject); carried separately for checking camera settings in the dark; or employed as interesting photographic props by another diver. During daylight dives, when a big light just isn't worth the hassle, a small light can be taken along to expose the vivid colors underwater and to illuminate interesting marine creatures which often hide in the shadows of holes, crevices and beneath ledges. Indeed, the smaller dive lights can be very useful pieces of equipment.

One light that fits into the category of a smaller dive light, and deserves your consideration if you're in the market for one, is Ikelite's Mini C-Lite. This relatively new addition to Ikelite's already extensive line of underwater lights is quite small and lightweight: It measures about six and one-half inches long and is two and three-quarter inches in diameter. It weighs approximately one pound out of the water, and is only a couple of ounces negative, with alkaline batteries installed, in the water.

The Mini C-Lite is designed to use four C size alkaline batteries, which supply power to a small flashlight-type PR-13 lightbulb. This battery-bulb combination gives a comparatively bright light beam

with reasonable beam width, and (according to the manufacturer) provides light for about four to six hours of operation. Less expensive carbon zinc batteries can be used with a PR-17 lightbulb — but the light's performance will be correspondingly reduced. Because flashlight bulbs, like the PR-13 and PR-17, are mass-produced, with little concern for precision, the light's intensity and beam pattern may change slightly when the bulb is replaced. However, I feel this minor drawback is more than compensated by the advantages of this type of bulb: It is inexpensive, readily available (at almost any drug or hardware store) and is very small (compared to a sealed beam lightbulb, for example), so that several bulbs can be carried in a spare parts kit as cheap insurance against lightbulb failure.

At any rate, I have a warm spot in my heart for small dive lights, and this Mini C-Lite is no exception. It appears to be a well-designed light with several nice features. The body is molded cycloc plastic —



a very durable material which experiences no corrosion problems in saltwater. The switch is a rotating on/off type, with a folding lever — which opens for easier operation, and closes to reduce the possibility of accidental turn-on. The light can be disassembled, basically, into four separate components: The bezel, which screws onto the body, clamping the entire light together; the clear lens cap which holds the main O-ring, and contains the reflector; the lightbulb holder, which holds (of all things) the bulb and attaches to the back of the lens cap with two simple endclips, making lamp changing extremely easy; and the body, which houses the batteries and the switch control, and has an attachment on the end for a lanyard. When reassembled, the light fits nicely into the palm of the hand. It can also be carried in a C-Lite holster (catalog item #1055 at \$9.95), which is optionally available. This rubber holder has adjustable straps, allowing the light to be attached to the diver's arm or leg, or to some piece of equipment — or, the holster can be threaded directly onto any two inch belt (e.g., a weightbelt).

Considering the features, the versatility, and the very reasonable cost (\$19.95), this cute little light should fit into any diver's budget, and every diver's plan.

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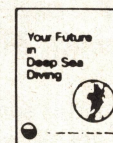


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NEW ENGLAND DIVERS

ScubaTech

BY E.R. CROSS

In the last ScubaTech, search patterns were discussed. Also, safety suggestions were presented that, if followed, will help make your commercial diving efforts as safe as possible. The present ScubaTech outlines additional search and inspection patterns that should be of help to the beginning and advanced commercial diver.

As pointed out in the last ScubaTech, the most important aspect of a successful search technique is to establish and rigidly maintain a search pattern. This is done by establishing marker buoy systems and expanding the buoyed area as each segment of the total search area is covered.

In almost all search patterns, it is also important to descend properly and to work with the least amount of contact with the bottom to prevent stirring up sediment. The most important item to assure a proper descent, and as a marker to prevent searching an area twice, is the descending line.

DESCENDING

In clear water when the object of the search can be seen from the surface, a scuba diver may opt to swim directly to the object. Swim slowly but proceed directly. If working with a buddy diver, keep him in sight during descent. If ear pains develop in either diver do not force the dive.

As stated previously, a descending line is the favored method of making a controlled descent to a specific location. This can be a rope of any size, of suitable length, to which a weight is attached. This line becomes the starting point of the search pattern(s). If visibility is quite good, it may be possible to keep the descending line in sight as you swim down to the bottom weight. If there is greatly reduced or no visibility it will be best to hold onto the descending line while making the descent or, in case of strong currents, to pull yourself down the line. Physically pulling yourself down a descending line also gives better control over the descent and usually aids in clearing the ears. If there is a strong current running, keep the current to your back and the descending line in front during descent. This will cause the current to force you into the line, and not pull you away from it.

WORKING ON THE BOTTOM

When a diver reaches the bottom, or other place of work, regardless of depth, he should remain there long enough to permit adjustment to the increased pressure. Sometimes, particularly when the dive is quite deep or the descent rapid,

the diver may suffer slight dizziness for a few moments on reaching depth. A short rest before starting a search pattern, or any other work, will usually cause this temporary effect to vanish. Also, the short wait will allow your eyes to become better adjusted to the sometimes greatly reduced visibility. And, finally, any turbidity caused by descent will have enough time to disperse before you start the search. While resting those few moments, note the direction of the current and the presence of any easily identified objects that may be used as a reference during the dive.

Before leaving the descending line, be sure the search line, or safety line from the surface, if used, is clear of the descending line and other objects in the area. Then proceed with the search pattern slowly and carefully for both safety and to conserve your air supply. If a free swimming technique is used, swim a couple of feet off the bottom to avoid unnecessary stirring up of bottom sediment. This may permit continued visibility throughout the dive that would otherwise be reduced to zero if the swim was made nearly in contact with the bottom.

When searching in rivers where the current is quite strong it may be necessary to place an anchor of some sort upstream of the area to be searched to which a long line is attached. The line should be at least four times as long as the horizontal span of the search. In other words, if a search area is to be 100 feet wide, use a search line of at least 400 feet. The anchor weight should have a buoy attached to it so the position of the anchor with reference to the diver can be determined. The boat, or other dive platform as required, can then be drifted downstream the required distance. While holding firmly to the search line the diver then goes over the side, with a life line attached, and is lowered to the bottom to begin his search. If at all possible, start at the downstream end of the search pattern and work upstream. This will usually permit locating any object, particularly a drowning victim, that may be displaced by the search line and drift downstream. The search pattern in this case is back and forth across the stream bed as far as necessary to cover the search area. After each sweep across the search area the diver can pull himself upstream about six or so feet and make another sweep until the object is found or the required area covered.

When one search area has been covered, the anchor is moved to the next area to be searched, and the sweeps again made downstream. It is advisable to leave the site of each anchoring buoyed to prevent searching the same area twice.

A similar search technique can be established for searching along underwater slopes that are too steep to search in other ways. Often objects that have gone off roads and highways lodge on

the steep slopes of dams or rivers. To search such areas, place the anchor weight far up the slope well above a position in which an object may be lost; possibly at the shoreline of the slope. Then, starting at the highest part of the search area, begin making sweeps across the slope. The reason for starting at the high point of the search area is to avoid dislodging an object above the diver that may roll down the slope and cause injury. By starting at the highest point the diver is above any object he may dislodge.

A scuba diver may find the use of underwater propulsion vehicles of great help in making a search for an article lost in reasonably clear water. Diver propulsion vehicles may be divided into towed units, manually propelled units, and powered units. Towed and powered units are the only ones practical for a search and recovery diver. Of these two, powered units are the most practical because of the lack of communication between the diver and a towing vessel for the towed-type units. However, under certain circumstances a towed unit should not be ruled out completely since a diver, when he spots the article searched for, can drop off the towed vehicle and mark the object for recovery.

Powered diver propulsion vehicles (DPV's) are usually small, torpedo shaped devices designed to pull a diver through the water. Most units are driven

by battery, and are of the greatest use in working against a strong current or in covering long distances where visibility is conducive to their use. Some units are equipped with a light. A compass can be used to maintain direction of the search pattern.

Plans and instructions for building DPV units are available from DPV, 10241 148th Street, Surrey, BC, Canada V3R 6S4. The cost of the booklet of plans and instructions is \$8.95 (\$9.95 via airmail). RJ Roussy of DPV Co., states he will provide purchasers of his booklet with information on the availability of the various components for making his DPV's. Write to him direct for this information when you order the plans.

RECOVERY OF LOST OBJECTS

Once the search pattern has been successful and the object of the search located, the next logical step is to float the object to the surface for recovery. The type of float used will vary considerably and will depend on the size of the object, the condition of the object when found, how much time is available for the recovery, currents and other conditions in the area of recovery, and the type of equipment used for handling the object when it reaches the surface. Usually, details of the actual surface recovery will be up to the supervisor of the project and it will only be necessary for the diver to locate and attach the proper flotation

gear to the object. With this in mind, ScubaTech will, for now, limit the discussion of recovery to flotation devices. If additional information is required, readers may write to ScubaTech for specifics.

Objects that can be used as flotation devices are numerous, and vary from plastic trash bags inverted in a net, a simple deck bucket inverted and tied to the underwater object, 55 gallon drums, to highly sophisticated commercial lifting pontoons. A diver soon learns to make do with what is available for lifting small objects.

Perhaps one of the most versatile lifting devices, and one that is most easily converted to use by divers, is the 55 gallon drum, or similar, smaller drums. They are lightweight, but are bulky to store and transport when compared with collapsible, inflatable pontoons. I adapted a 55 gallon drum and used it for many years with considerable success.

The top of the 55 gallon drum has two holes normally plugged with screw-type fittings. The large fitting should be tightened and left in place. The small opening plug should be removed. The threads for this fitting are standard three-quarter inch pipe threads. Into this, a short, three-quarter inch pipe nipple can be screwed. A valve can later be installed on this nipple for controlling the buoyancy of the pontoon.

The top and bottom rings of the drum
(Continued on Page 80)

Consumer Product Safety Commission and AMF Voit, Inc. urge consumers to participate in recall of potentially defective spear guns

Following a low rate of consumer return of potentially hazardous aquatic spear guns which have been recalled, the U.S. Consumer Product Safety Commission and AMF Voit, Inc. are repeating public warning of the hazard and urging consumers to participate in a free repair program.

Only one per cent (1,009) of the estimated 97,300 potentially hazardous spear guns have been returned to the manufacturer for free repairs since the recall was announced more than a year ago. These spear guns may contain a defective trigger and as a result may fire accidentally even though their safety catches are engaged.

AMF Voit has received 13 consumer complaints about this malfunction; neither CPSC nor the company has received any reports of deaths or serious injuries.

Spear gun Models G6 and G7 manufactured since May, 1979, are not being recalled and can be easily identified by a serial number affixed to the barrel or handle.

The "carbine" spear guns being recalled (not serialized) were sold nationwide in specialty stores from 1967 to 1979 under the AMF Voit, Inc. label. The company's name can be found on the left side of the grip of the two models being recalled. One of the recalled models may be identified by a 17-inch aluminum barrel while the other features a 26-inch aluminum barrel. Both models have black plastic handles.

Sears, Roebuck and Company also marketed 1,400 spear guns under its private label between 1970 and 1973. These models may be identified by a 17-inch aluminum barrel and the model number 436.573140 displayed along with the Sears name on the left side of an orange colored plastic hand grip.

Consumers who own the AMF or Sears models should disassemble the unloaded spear gun handle assembly (which includes the grip and the trigger) from the gun barrel by removing the screw holding the two parts together.

To obtain free replacement parts, the gun handle and the shaft of the spear should be mailed to the nearest AMF Voit outlet listed below. All postage costs will be reimbursed fully; parts should be mailed by insured fourth-class parcel post, with a return receipt requested. Consumers should NOT return the gun barrel, the spear point or the shock lines.

AMF Voit centers accepting parts for replacements are:

AMF VOIT, INC.
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AMF VOIT, INC.
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201/343-2450

AMF VOIT, INC.
71 Dawson Road
Guelph, Ontario, Canada
519/822-1576

Although Sears has received no consumer complaints, Sears stores nationwide will accept returns of its privately labelled model for modification by AMF Voit.

Anyone requiring further information about this recall should contact CPSC's toll-free Hotline at the following numbers: in the Continental U.S., dial 800-638-8326; in Maryland, 800-492-8363; and in Alaska, Hawaii, Puerto Rico and the Virgin Islands, 800-638-8333.

Imagine diving as much as you like in the warm, clear green waters of the Sea of Cortez; shelling on the scorching sands of the Baja Peninsula; skiing at sunset in the calm, quiet bay of a deserted island; relaxing in a comfortable chair, drinking ice cold *agua mineral con limon*; dressing formally for dinner in your best T-shirt.

All this and more is available on a one week trip aboard the *Marisla II*. A 121 foot converted buoy tender, the *Marisla's* home port is La Paz, Mexico. Ninety percent of the people who sail with her are divers. And, the diving is superb. There is a little bit of everything. In one week, I made 28 dives, including five at night. Whether you're into sight-seeing, snorkeling, photography, shelling or wreck diving, this trip has something for you. During my week with the Santa Monica Blue Fins, we investigated a wreck; swam with seals; admired a mind-boggling array of seafans; dove for tent olives; explored a shallow cavern; watched manta rays soar by; and, saw schools of hammerhead sharks.

Non-divers are not left out of the activities, either. One of the *Marisla's* two skiffs is almost always available to shuttle beachcombers to the nearest land. Marvelous finds have been made on these beaches: Newly cleaned shells; old shells polished by the waves and sand; hammerhead shark skulls; and assorted, sunbleached animal bones. In addition, there is spectacular desert scenery to photograph and admire. For non-divers who love the water there is snorkeling and water skiing. There is even some fishing gear available and on my trip one of

the guests hooked a mahi-mahi which was delicious.

A day on the *Marisla* starts early. Breakfast (eggs prepared to order) is served in the dining room from 7:30 to 8:30, but there were always people up before that snorkeling and swimming. Snorkeling just after dawn is exceptionally interesting: Morays can be seen free-swimming then.

After breakfast the boat usually moves to a new site for diving. Except for the first afternoon and the last day when the boat travels a lot, there is almost unlimited diving. You put on a tank, take a few steps and giant stride into the water. After the dive, board the boat, take off your tank — a crew member will help you. The tank will be filled by the time you are ready to go into the water again.

Most of the dives are made in 40 feet or less of water and except for two dives, there is always shallow water for snorkeling.

Lunch is served on the fantail at noon. It is a sit-down affair and ranged in variety from clam chowder, prepared from freshly dug clams, to tacos. All were delicious.

While lunch is being served the boat is usually moving to a new dive site. After lunch there is more diving and snorkeling. Many people spend some of that time taking a siesta or reading. We had an extra diversion in the form of two AquaScooters which we played with while waiting for lunch to settle.

The boat usually anchors for the night just before sunset, in 30 feet or less of quiet water in a little bay. This is the time that water skiing is offered. Afterward, everyone gathers on the fantail for cocktails. On my

trip there were a number of photographers and there was much good-natured jostling as we vied for the "best" spot to photograph the spectacular sunsets. Almost every night there was a gorgeous sunset, no two were alike, and each one seemed more fantastic than the last.

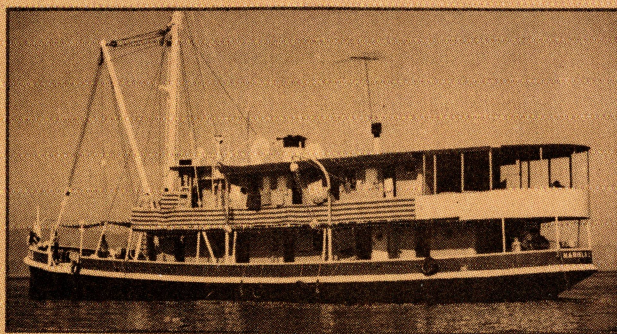
Dinner is served around 7:30. It is announced by taps on the floor of the fantail from the women below in the dining room, and is always excellent. One evening we had lobster and another fish, freshly speared by the captain and one of the guests. The last evening is formal — save your best T-shirt! We were served Chateaubriand. Although I made 28 dives and spent at least 14 hours underwater, as well as uncounted hours snorkeling and AquaScootering, I lost nary a pound. (Yes, the food is good!)

The magicians responsible for my marvelous week aboard the *Marisla* were Richard and Maria Luisa (Mary Lou) Adcock. He is a tall, blue-eyed American. She is a petite, dark-eyed Mexican National.

Richard was raised in Laguna Beach and started diving when he was nine. He served in the Merchant Marine during World War II. After the war he trained as a teller with the Bank of America, but because of his background in the Merchant Marine, was transferred to the International Division. During this time he visited, dived and fell in love with the Sea of Cortez.

The Adcocks started sight-seeing trips for tourists in the Sea of Cortez in 1958 on the barge *Thursday*. These trips did well and in 1964, they bought the *Marisla I* and started running dive trips.

Cortez Cruiser



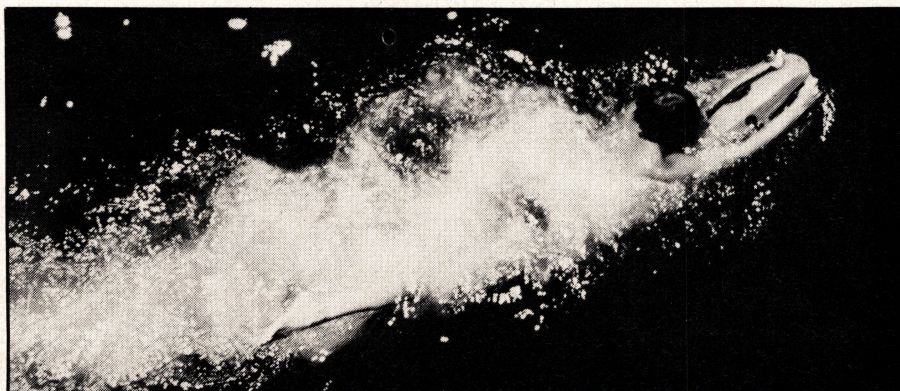
A diver's odyssey aboard the *Marisla* By Bonnie J. Cardone



photography by Steve Wilson

Cortez Cruiser

photograph by Bonnie J. Cardone



There were alternative activities — a siesta perhaps — but we chose AquaScooting after lunch.

The *Marisla II*, the current boat, was purchased in 1968. She had been the *U.S.S. Columbine*, a buoy tender, on the Sacramento River since 1930. *Marisla* means "sea isle" and she is so stable and steady in the water that her guests never need to develop "sea legs."

By law, Mexican vessels cannot be owned by anyone other than a Mexican National. Thus, Mary Lou is the legal owner and captain of the *Marisla*. This is not just in name only. Richard points out with pride that his vivacious wife has worked her way up through study and

tests to be a *patron de costa*. She is the only Mexican woman to have attained such a rank and the only Mexican woman to be the legal captain of a ship.

The *Marisla's* accommodations are plain. There are eight staterooms, each with its own toilet and small sink. (There are two hot water showers in the bathrooms on the main deck and a shower by the dive ladder for after-dive-rinses.) The rooms are quite small, with a double lower and single upper bunk. There is no air-conditioning, but a fan in each room provides a welcome breeze. Most of the guests soon learn that they are more comfortable at night if they leave their stateroom doors open. Bugs are nonexistent anyway.

The *Marisla* runs from Easter to Thanksgiving. Weights, weightbelts, tanks and backpacks are provided, although you will probably be more comfortable with your own weightbelt and the *Marisla's* weights. The water is in the 70's, so wetsuits are not needed. There are, however, tiny stinging organisms in the water so some type of body covering is necessary. Leotards, tights, T-shirts and sweatshirts are fine. A bathing suit is appropriate for all occasions. Bring insect repellent, and old tennis shoes if you want to beachcomb.

The price of a week aboard the *Marisla*

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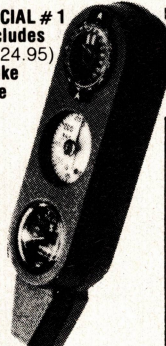


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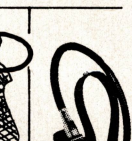
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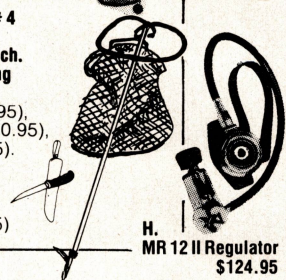
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Sea Quest Pro Jacket, Back-Pack,
CO₂ cart. & power inflator \$164.95
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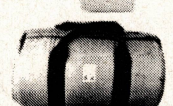
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is \$99 per person per day, plus six percent Mexican sales tax. This is based on a minimum five day charter for a minimum of 16 people. Air fare is extra. Soft drinks, beer and hard liquor are extra. There is a "welcome to the *Marisla*" party, with complimentary Margaritas, on the afternoon you arrive. These taste wonderful after the dusty taxi ride and loading the boat.

A few of the dive highlights are listed below.

The wreck of the *Salvatierra*. This is not always divable because of the strong surface currents. When it is, it's great. The area abounds with shells and fish life. The *Salvatierra* rests on a sandy bottom in 60 feet of water. Because of the currents it is best to go down the anchor line and return the same way. If you swim steadily, you can see the entire wreck in one dive.

The Sea Mount. This undersea pinnacle is not for the faint of heart. The top starts 80 feet down. Manta rays always showed up during our dives. Also seen on each of our four dives were hammerhead sharks. Sometimes schools of them. Adcock says he has no fear of these sharks and has done a lot of diving with them.

Los Islotes. This group of rocks is notable for the sea lions living on it. They

are friendly and some good pictures have been taken of them. The boat anchors in 60 feet of water, just a few yards from shore.

Las Animas. This is one of the most spectacular dives of the trip. It is also the most difficult. There is almost always a strong surface current and the boat must anchor a fair distance from the rock around which you dive. It is well worth the effort. You feel as if you are in an enchanted garden. The water is clear and blue and there are spectacular sea-fans of every imaginable color. Myriads of colorful fish, like topside butterflies, flit about.

Night diving. In the calm, shallow, close-to-shore waters this is very simple. There are no currents or waves to contend with. And, since the *Marisla* is well lit, she is always easy to find when you've surfaced. Littering the bottom on almost all of our dives were wierd, incredibly long, sea cucumbers which resembled lengths of intestine. And, there are always the puffer fish, which blow themselves up like balloons when handled (gently, of course).

For more information on *Marisla* trips, contact: Beverly International Travel, Inc., 9465 Wilshire Blvd., Suite 832, Beverly Hills, CA 90212. Or call: (213) 271-4116.

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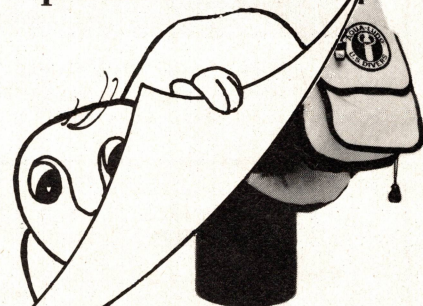
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Scuba Quiz

Category: Snorkels

By Dennis Graver

The snorkel is probably the most simple piece of dive equipment, but its simplicity may be deceptive. Proper use of a snorkel requires training and practice. Selection requires a knowledge of physics and physiology. Test your knowledge of snorkels and their use with the following questions. Answers are on the next page.

1. Which of the following factors should be the most important consideration when selecting a snorkel:

- ☐ A. Length and style
- ☐ B. Purge valve
- ☐ C. Breathing resistance
- ☐ D. Clearing ease

2. Select the true statement:

- ☐ A. The snorkel must be attached to the mask strap
- ☐ B. A snorkel is a necessary item for open water diving
- ☐ C. A long snorkel is preferred for open water diving
- ☐ D. Flex hose snorkels are the best all-around snorkels

3. When breathing through a snorkel, your breaths should be:

- ☐ A. Quick and shallow
- ☐ B. Quick and deep
- ☐ C. Slow and shallow
- ☐ D. Slow and deep

4. To prevent drops of water from being inhaled and causing choking, divers should:

- ☐ A. Use the tongue as a barrier
- ☐ B. Drain all water from the snorkel
- ☐ C. Exhale slowly and inhale quickly
- ☐ D. Not use the snorkel in choppy water

5. Which of the following contribute to the effort required to breathe through a snorkel:

- ☐ A. Length and diameter
- ☐ B. Interior corrugations
- ☐ C. Sharp bends
- ☐ D. All of the above

6. The band on the end of a snorkel is intended to:

- ☐ A. Identify the manufacturer
- ☐ B. Identify the type of snorkel
- ☐ C. Increase the visibility of the snorkel
- ☐ D. Provide structural strength

7. Select the best description of how to blow the water clear of a snorkel:

- ☐ A. Like blowing up a balloon
- ☐ B. Like shooting a pea shooter
- ☐ C. Like blowing out a candle
- ☐ D. Like blowing a musical instrument

8. When clearing a snorkel by the displacement method, exhaling should take place:

- ☐ A. Early in the ascent
- ☐ B. Immediately before surfacing
- ☐ C. As the snorkel clears the surface
- ☐ D. All of the above

9. A sore jaw the day after diving is probably owing to:

- ☐ A. Too large a mouthpiece
- ☐ B. The wrong style mouthpiece
- ☐ C. Biting too hard on the mouthpiece
- ☐ D. Talking while biting a mouthpiece

10. A properly adjusted snorkel will:

- ☐ A. Be positioned on the left side
- ☐ B. Enter the mouth without torsion
- ☐ C. Remain in place when the mouth is opened
- ☐ D. All of the above

Scuba Quiz

Answers: Snorkels

1. C. Breathing resistance. Difficulty in moving air through a snorkel can lead to a carbon dioxide buildup in the body. CO₂ excess will shorten breath-hold time and can cause headaches and air hunger. Be sure to select an easy breathing snorkel. Compare snorkels by breathing as deep and hard as you can through them.

2. B. A snorkel is a necessary item for open water diving. A human head weighs about 17 pounds out of the water, but nearly nothing when submerged. A snorkel allows a diver to breathe with the head in the water and should always be available for surface swims in open water. I once helped a man without a snorkel who nearly drowned because he surfaced far from the dive boat and exhausted himself swimming back.

3. D. Slow and deep. Slow inhalations keep water from being inhaled and keep breathing resistance from being increased due to turbulence in the snorkel. Deep inhalations and exhalations are needed to exchange the air in the dead air space of the snorkel and airways. Shallow breathing through a snorkel will lead to a carbon dioxide buildup because the air in the dead air space will be rebreathed.

4. A. Use the tongue as a barrier. By placing the tip of the tongue on the roof of the mouth behind the teeth, a splash-board is formed that will intercept drops of water inadvertently sucked into the mouth. Also, inhalations should be made cautiously until you are sure the snorkel is clear of water.

5. D. All of the above. Breathing resistance is increased as the bore of the snorkel is decreased and as the length of the bore is increased. Sharp bends, interior corrugations, devices to prevent water entry, and small mouthpiece openings can also add to breathing resistance.

6. C. Increases the visibility of the snorkel. A brightly colored band on the end of a snorkel can be seen far away at the surface of the water. A luminous band is helpful for night diving. Replace the band with brightly colored waterproof tape if it comes loose.

7. B. Like shooting a pea shooter. When clearing a snorkel by the blast method, it is best to build up lung pressure and expel the water as quickly and as hard as possible. Although the displacement method is easier than the blast method, all divers should be proficient at blowing the water clear of a snorkel.

8. D. All of the above. With the displacement method of clearing, a puff of air is exhaled into the snorkel at the beginning of an ascent. This air expands during the ascent and displaces the water in the inverted snorkel. Exhalation is begun again just beneath the surface and continues as the head is rolled forward. When done properly, there will be *no* water remaining in the snorkel.

9. C. Biting too hard on the mouthpiece. With a mouthpiece in place, the teeth do not meet in the back. This places a strain on the jaw and can cause soreness. Avoid biting on the mouthpiece. Let the grippers on the mouthpiece and the muscles of the lips hold the snorkel in place.

10. D. All of the above. The snorkel is worn on the left because the regulator comes over the right shoulder. If the mouthpiece must be twisted to fit into the mouth, it will be necessary to bite on the mouthpiece to hold it in place and the jaws will tire. The mouthpiece will remain in place when the mouth is opened wide if the snorkel is the right type and adjusted properly.

The snorkel may be simple, but I believe it is one of the most important pieces of equipment to learn to use properly. Proficient snorkelers make excellent scuba divers, but the converse isn't true. Was your knowledge concerning the selection and use of snorkels up-to-date? If some of the ideas presented were new to you, how about a practice session in the pool?

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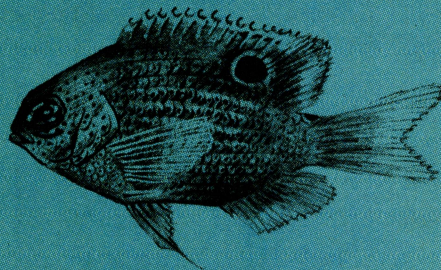
The Dusky Damselfish

(*Eupomacentrus fuscus*)

Next to angelfishes and butterflyfishes, the damselfishes are quite often the most colorful additions to the tropical and subtropical reefs of the world. However, there are several species of damsels that assume an overall dark, drab color as adults, losing their brilliant rainbow hues to a kind of spreading achromatism that is brought on by age. In the western Atlantic this phenomenon occurs with many of the *Eupomacentrus* species of damselfishes. *Eupomacentrus planifrons*, *leucostictus*, *variabilis* and *fuscus* all have bright bodies with spots and stripes when young, but with growth they become nearly black, dark brown, or dusky colored. □ In Latin, *fuscus* means dusky, or brown, and this is the scientific name given to the dusky damselfish, a very common fish of Caribbean reefs. A previous scientific name, *dorso-punicans*, was no doubt given because of its literal translation, *punic* meaning reddish or purple, *punica* meaning pomegranate. The dorsal area of the juvenile *E. fuscus*, including the nape, is a reddish-orange or crimson pomegranate. The red coloration of the juvenile dusky damsel is distinctive to the species. The juvenile also has two prominent spots, both of them black and narrowly ringed with blue. The most prominent spot is at the base of the dorsal fin, and the smaller spot is on the base of the tail. Young dusky damselfishes have this colorful costume until they reach about an inch in length, and then the darkening begins. The fish grows to about a length of six inches. □ Damselfishes belong to the Pomacentridae family, which is characterized by a single nostril on each side of the snout instead of the usual two. The typical body shape of pomacentrids is round and flattened. Most damselfishes live in reef communities, finding protection and shelter among the cracks and crevices of rocks and corals. Generally they are shallow-water fishes. Ichthyologists Bohlke and Chaplin report that while they col-

lected the dusky damselfish from as deep as 50 feet in the Bahamas, nearly all of their collections were from less than 20 feet, and that some came from just a few inches of water and from tide-pools. The ichthyologists document the range of the dusky damselfish from Bermuda, the Bahamas and Florida, throughout the Lesser Antilles, including the Gulf of Mexico. It is one of the most common inshore reef fishes of the Caribbean, where it can often be seen swimming over seagrass beds. According to a study by ichthyologist John Randall, *E. fuscus* feeds primarily on algae

and sessile (non-moving) organisms. The teeth of the *Eupomacentrus* species, closely set in one row in the jaws, are well adapted for grazing. Algae and organic detritus constitutes over 50 percent of the dusky damselfish diet, and Randall determined that the fish also eats small amounts of about everything else: Polychaetes, copepods, fisher, gastropods, isopods, amphipods, eggs, shrimps, crabs, pelecypods, tunicates, hydroids. □ Damselfishes are as well known for their behavior as well as for their looks. They are pugnacious, feisty little fishes that will attack intruders many times their size — even divers. This courageous behavior usually occurs during mating time, when the male guards the patch of eggs laid by the female. This watch is taken seriously by the guardian, who swims back and forth nervously over his potential brood both to aerate the eggs and to make sure that no swift-moving predator has a chance to dart in for a meal. If a diver unknowingly ventures too close to the scene of incubation, he will undoubtedly be met by a fierce little fish that will nip fingers, arms or fins. One imaginative diver who experienced such a display of bravado from a damselfish reportedly exclaimed in amazement, "Hell! A shark with the courage of that little thing would attack Manhattan!"



juvenile phase

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Photo By John Lidington - Text By Hillary Hauser

The photograph was shot in 10 feet of water on Molasses Reef, Pennekamp Park, Florida. Lidington used a Nikon F2 in Hydro 35 housing, 55 Micro Nikkor lens, a Farallon/Oceanic 2001 strobe with 2000 slave.

TIPS

To Insure Perfect Scuba

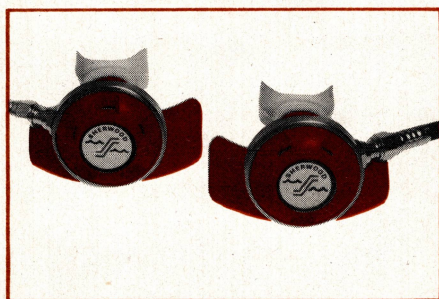


GIVE EXTRA ATTENTION TO YOUR OCTOPUS

Diving with an octopus regulator is a good safety precaution for emergency breathing situations, but it will only be useful if it's in top operating condition, readily accessible and clearly visible at all times.

Problems often occur when an unattached octopus collects sand or strikes an object and becomes damaged. So when you dive, be sure that your octopus is securely clamped to your diving equipment or your BC.

Also it's important to place your octopus in a conspicuous location. Let your diving buddy know where it is and the easiest way to get it. Make a habit of clamping it in the same spot on each dive to eliminate confusion when it is needed.



For easy underwater identification, the new Sherwood octopus regulators are a bright orange color. In addition, they are durable—all assemblies are made of high-impact thermo plastic and are corrosion-resistant.

What's more, only Sherwood offers either right-hand (Model SR-3207 PR) or left hand (Model SR-3207 PL) entry for the air supply hose. With this feature, it's easy for you to position your octopus where you want it, and locate it when you need it.

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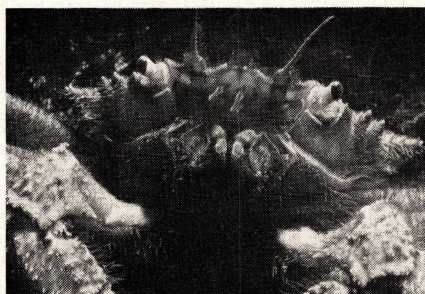
THE SAANICH INLET — DIVING A FIORD

TEXT AND PHOTOGRAPHY
BY JAMES M. CRIBB

As the mountains turned to crimson in the morning sun, a companion and I swam out 15 feet from shore, deflated our BC's, and slowly descended into the deep abyss of the Saanich Inlet. Nestled between the Malahat Mountains and the Saanich Peninsula on Vancouver Island, British Columbia, this deep fiord offers an extraordinary dive.

The underwater topography is as rugged and diverse as the shoreline. Walls drop straight off to 80 or 90 fathoms and overhanging ledges and deep crevices beckon the explorer. It's hard to duplicate the feeling of hovering around 100 feet and seeing the wall go straight down into darkness.

As you begin your descent you will enjoy the delicate interplay of different shades of green reflected from the lettuce kelp. In and around the rocks various kinds of nudibranchs inch along, and small gobies and sculpins scurry for cover as you pass. There are a number of different types of crabs ranging in size from the large Dungeness to the



tiny hermits who peer out of their borrowed homes. Many hours of bottom time could be spent rummaging around just a few feet below the surface.

While the shallow depths offer their own blend of unique flora and fauna, the inlet really excels in the deeper dive; for at these depths one enters the domain of the incredible sponges. These sponges offer protection for many smaller creatures and it is not uncommon to see a rockfish cradled in the hollow of the tube.

Boot sponges can be seen projecting from rocky walls at 60 to 80 feet. Drop down a little deeper and you will enter a veritable garden of cloud sponges. These delicate creatures flourish in a variety of shapes and designs. When swimming over a carpet of these, you feel as if you were floating over clouds.

For the protection of both diver and sponges, care must be taken on these dives. Cloud sponges are generally not

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found above 90 feet and are abundant around 120 to 130 feet. As this is close to the limit for sport diving, it should be attempted by experienced divers only. As for sponges, they are delicate creatures and will break apart with just a kick of a fin.

Other marine life that inhabits this area includes spiny dogfish and rays, large lingcod, seabass, octopus, anemones, tubeworms, and the list goes on and on. If you're lucky you may even get a visit from some harbor seals.



Some of the clearest waters in the Pacific Northwest occur in the Saanich Inlet. During the winter, visibility can exceed 100 feet, with an average of 50 to 60 feet. During the summer, however, visibility is decreased on the top 30 feet due to the abundance of plankton. Below this layer visibility is generally in the 30 to 40 foot range. The combination of excellent visibility, negligible currents and a sheltered location makes the Saanich Inlet a decided favorite.

As southern Vancouver Island is diver oriented, getting air fills, renting equipment, and seeking advice on good dive areas is an easy task. Rimpac Divers in Sidney is open seven days a week for air and rentals of wetsuits and assorted dive gear. In Victoria there are two dive shops from which to choose: Frank White's Scuba Shop and Ocean Dive Center, which is also open seven days a week.

Access to the Saanich Inlet is easy. Boats can be rented in Brentwood Bay from Brentwood Boat Rentals or Gilberts Marine and Guide Service at reasonable rates. If you have your own boat it can be launched at Gilberts.

A chart of the Saanich Inlet (#3451) can be obtained at most boating stores. The following are a few places I would recommend; however, there are numerous places where diving is possible and all that is required is a boat and an adventurous spirit.

For those interested in seeing the sponges, Repulse Rock is for you. Commonly known as the White Lady, this rock is marked by a buoy about three-quarters of the way down the inlet. Dive the southeast side where a sharp drop-off will lead you down to 110 feet and the cloud sponges.

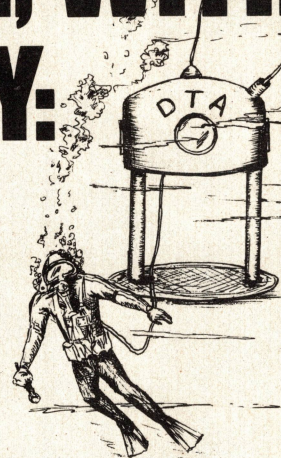
Eighty-four fathom point, halfway between Repulse Rock and Hall's Boat

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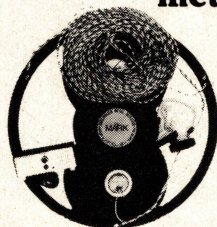
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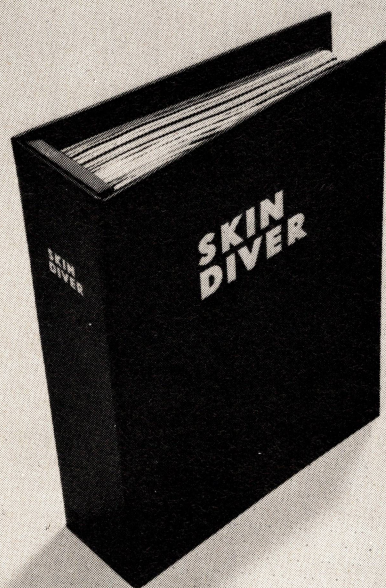
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THE SAANICH INLET

House on the western side of the inlet, offers the most vertical wall dive I have ever found. To locate the dive site on the chart, follow the west coast north of Christmas Point till you come to the 84 fathom mark. Here you will find many crevices to explore and, of course, the ubiquitous sponges.

McCurdy Point offers an incredible diversity of underwater landscape; rolling



hills and valleys confront the diver exploring the abundant marine life.

Senanus Island, just off Brentwood Bay, offers a wide assortment of life in shallow waters. Keep a look out while diving here as you may see one of the curious harbor seals that frequent this island.



For those wishing a shore dive, MacKenzie Bight or Henderson Point is the answer. To get to Henderson Point drive to the end of Senanus Road, park your car at the cul-de-sac, and walk 100 feet to the water. To reach MacKenzie Bight, drive through Durrance Lake Park and turn left onto Mark Lane from Willis Point Road. There are several rough paths toward the end of the lane that lead to the water.

Saanich Inlet offers an excellent alternative to those who are tired of being buffeted by swells or fighting the currents. Good visibility, easy access, and a variety of topography and wildlife result in a most satisfying dive.

RICHFIELD GRANT

Christopher Dann, president of Ocean Trust Foundation, has received a grant of \$5,000 from the Atlantic Richfield Foundation. The funds will be applied to the development of Ocean Trust's programs of marine scientific research and public education.

The Research Vessel *Eagle*, a 221 foot former Coast Guard training ship, will serve as the principal facility for the Trust's scientific complement and as platform for natural history film documentation by the Trust's affiliate, Ocean Films

The *Eagle's* first tour of duty will be a circumnavigation of the Pacific Basin. Research sites will be selected by Ocean Trust and Ocean Films for the richness of opportunity for scientific research and film documentation. Students and scientists alike will have access to an archives of unedited copies of all films produced by the film company and donated to Ocean Trust. The films will complement investigators' annotations in an effort to make current information about the ocean broadly available.

DIVERS' GUIDE

Sea Hut Publications is in the process of publishing a complete Divers' Guide encompassing all of Northern California, up to and including Santa Barbara. The guide would furnish complete information on all areas such as: Dive shop services, area conditions, and what a visiting diver might expect; including accommodations. If your shop would like to be included in our book, please write to: Sea Hut Publications, Willows Shopping Center, 1975 Diamond Blvd., Concord, CA 94520.

METZELER APPOINTS J. J. MCGUINNESS

Metzeler Kautschuk, GmbH of Munich, West Germany, has appointed J. J.



McGuinness to represent Metzeler's Leisure Product Division for the North American region. Mr McGuinness has extensive experience in the special marketing and technical areas of this sector of the marine industry.

GOVERNOR JOINS CLUB AQUARIUS

Steven Bowden, president of the Denver Chapter of Club Aquarius, announced that Colorado Governor Richard Lamm is now a member of the club.

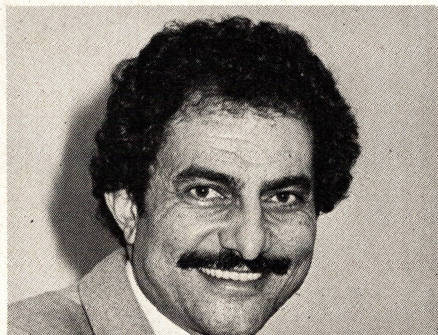


Governor Lamm was certified as a scuba diver through NASDS. He is an avid diver and has been active in the sport since 1953.

Club Aquarius is a social organization for sport divers that stresses education, conservation and adventure travel. The Denver Chapter of Club Aquarius is sponsored by Denver Divers Supply and Training Center, a division of San Diego Divers Supply. Club Aquarius meets the third Wednesday of each month at 7 pm, 557 Milwaukee Street, Denver, CO.

SCUBAPRO EUROPEAN FINANCIAL DIRECTOR

Dick Bonin, President of Scubapro, has announced the promotion of Mamdouh Ashour to the position of European



financial director. He will be in charge of coordination for Scubapro's seven European subsidiaries. Mr. Ashour has been with Scubapro for over six years and was controller for the U.S. facility. Mr. Ashour will be headquartered in Nice, France. For information contact Scubapro, 3105 East Harcourt, Compton, CA 90221.

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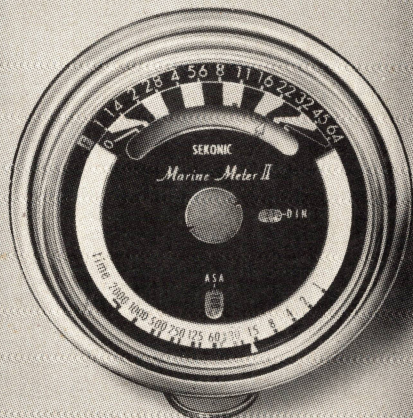
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TOP 10 WRECKS (Continued from Page 23)

she was captured by an enemy raider and taken to a German port. But the Germans would have boasted of their feat and post-war records do not list her.

How could a ship that unsightly just disappear? Divers are just as curious to answer that as the Navy. If divers ever find her they will uncover one of the greatest mysteries of the deep.

The Central America — Somewhere off the coast of South Carolina lies the wreck of the steamship, *Central America*, sunk in a hurricane on September 12, 1857, with over two and one-half tons of registered gold aboard. Over 400 men lost their lives, most of them miners who sought their fortunes in the California gold rush and upon returning home had all their earnings with them.

On September 8 the 280 foot, three-masted side-wheeler passed through Panama and cleared Havana in fine fashion, sailing under brisk winds and clear skies. But the wind increased and the seas boiled and by September 10 a full gale encompassed the 2000 ton ship. On September 11 water leaked into the furnace room, preventing the crew from firing the furnaces. The engine went dead from lack of steam while the helpless vessel bobbed like a cork in the thrashing seas.

On the morning of September 12, the sea calmed and the bark *Marine*, out of Boston, spotted the *Central America* and rescued the women, children, and a few of the men. She had no more room for the rest of the passengers and crew. That afternoon, a passing schooner ignored the distress signals from the *Central America* and left over 400 men to the fate of mother nature. At dusk heavy seas forced more water into the furnace room and the ship foundered in the night.

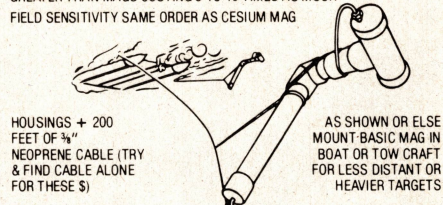
The next day the Norwegian bark, *El-len*, hove to and rescued some of the men who had drifted in the sea all night, clinging to spars from the hapless vessel. The *Central America* is reported to be in deep water near the edge of the Gulf Stream, its precious cargo still intact.

The Pan Massachusetts — The fate of this 8800 ton tanker, torpedoed by a German U-boat in 1942 off the coast of Florida, is best told by her skipper — Captain Robert E. Christy: "It's a wonder the sub sighted us because of the poor visibility and 10 to 15 foot waves. It happened suddenly — two torpedoes hit us in rapid succession, exploded amidships and started fires below decks and in the sea. We had 50,000 barrels of gasoline and 50,000 barrels of kerosene aboard and if it had caught fire all at once we would have gone up in a puff of smoke.

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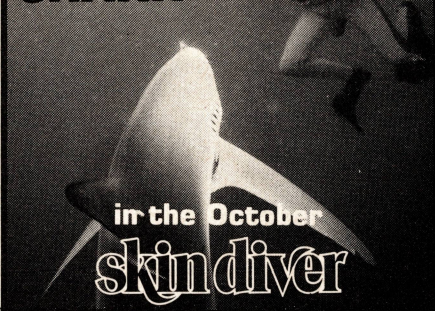
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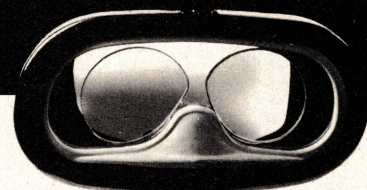


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"The sub surfaced and shelled us unmercifully, but I ordered the men not to jump overboard or they would burn to death. We threw a heavy mooring line over the bow, made it fast, then slid down one by one into broken patches of open water. Numb and very weary from dodging the flames for over two hours, we spotted a tanker and started yelling. The skipper took a big chance of being torpedoed when he headed our way and rescued 18 of us. He even broke radio silence to call for help.

"Two Navy planes appeared and searched for survivors. They found one — John Dodge, third officer from Baltimore, who survived for three hours without a life vest. Twenty-nine of my crew died. We were the 19th ship sunk by German subs off the east coast of the U.S."

The rescue vessel returned Captain Christy and the survivors to Florida. The torpedoed tanker is in 150 feet of water, somewhere off Jacksonville.

They are strewn from Maine to Florida, ten of the East Coast's best wrecks. Some are treasure-laden, some are historical finds, and others are just intriguing. Jean Haviland says, "Shipwrecks are fascinating memorials, preserving history and immortalizing the people who built and sailed them. Divers who discover these time-honored reminders of a bygone era will glean their little niche in history too."

PADI TEXTBOOK

PADI has published a support text for the PADI Advanced Open Water Diver Course. The publication contains a number of unique features.

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For information on the text, contact PADI Headquarters, 2064 N. Bush St., Santa Ana, CA 92706.

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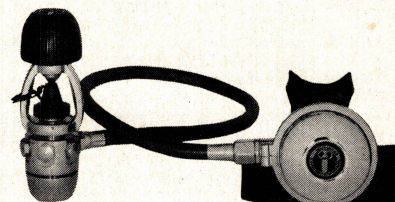
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SCUBA TECH

(Continued from Page 63)

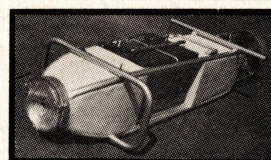
are of heavy metal, and the side lifting straps (item two in the material list) can be welded to these heavy rings. Be careful not to burn through the thin metal making up the rest of the drum. Item three in the material list is welded across the lifting straps to provide stiffness. The one and one-half inch diameter holes burned through the lifting straps are used to secure the one-fourth inch chain to the object to be raised. Do not cut the entire bottom out of the drum. Cut only a hole about eight inches in diameter in the center of the bottom. When the drum floats toward the surface, expanding air will exit from the eight inch hole but, while the float is bobbing in the waves, this relatively small hole will prevent the drum from spilling all the air and will keep the recovered object afloat. If the entire bottom were cut out, most or all of the air would spill when the drum surfaces and the object and the drum would sink to the bottom again.

A 55 gallon drum will displace about 470 pounds of water and will float about 400 pounds net weight. Use one-fourth inch chain to secure the float to the object to be raised. Rope will wear through and the object will be lost.

Another use for the modified 55 gallon drum is to float objects on the surface after they have been raised. Sketch number two shows the modifications needed to make a float drum. Steel plates are welded across the ends of the drum as shown. The plates (lifting straps) have holes burned through the ends through which one-fourth inch chain is passed to secure the object. This type drum is not intended to raise objects, but to keep them afloat once they have been raised by other methods. These floats are particularly good for floating hoses or pipe lines.

Warning: Do not cut into, or weld on, an empty drum with a cutting torch until it is ascertained positively that it does not contain an explosive vapor. Drums that have contained any hydrocarbon products should be steam cleaned prior to welding or burning on them. Drums that have contained chemicals should be cut with caution since heat may produce harmful fumes. Use a pneumatic cutting chisel, or a hammer and cold chisel, when cutting into an empty drum if there is no time for steam cleaning. Fill the drum with water prior to welding the fittings on the drum.

Collapsible rubber salvage pontoons were available at least as early as April, 1946 when the U.S.S. *Widgean*, a submarine rescue vessel, made tests of five ton pontoons off the island of Maui, Hawaiian Islands. Tests were conducted



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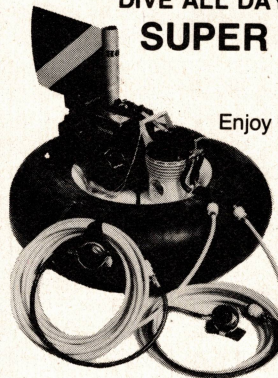
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in 165 feet of water with enough success that the pontoons were recommended for Navy use.

Helmet divers were used in these tests, but the findings of this group still hold true today when such pontoons are routinely used by scuba divers. One of the findings in these tests was that the diver could take the pontoon to the bottom upside down more easily than with the open end down. In my frequent use of many of today's similar pontoons, we also find this is the only practical way of getting the pontoon to the bottom. Also, when currents are running the pontoon is easier to control if the open, bottom end, is up. In one incident when divers took the pontoon (a five ton unit) down bottom first, a two knot current caught the open end and ballooned it out, carrying the pontoon and two scuba divers across the ocean bottom for nearly one-half mile before they could secure the lifting chain to a coral head heavy enough to stop the pontoon. They left a string of upturned coral heads along a half-mile track of ocean bottom.

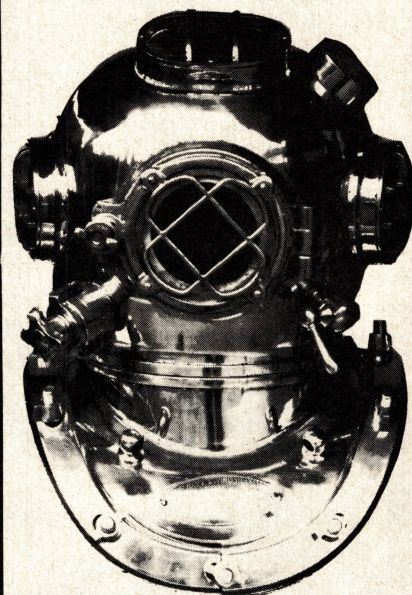
At least two companies have advertised lift bags or collapsible pontoons in SKIN DIVER in recent years. I have used the products of both companies and find that both need modification to be really suitable for a large commercial job where perhaps ten or more pontoons are needed to lift and hold long, heavy objects. In both products, the exhaust valve, or dump valve, must be held open by a diver to dump air. This requires more divers than are usually available when a dozen lift bags are in use and must be controlled all at one time. On all our pontoons we have installed a standard gate valve (brass, three-quarter inch) in, or nearly in, the top of the lift bag. This permits one diver to open and control many pontoons along a long string of bags. The installation of this valve also permits installation of an air hose from the surface to the bag for surface control.

The concept of collapsible lifting pontoons is excellent, but the products need to be evaluated by the manufacturers and redesigned to meet the rigorous work requirements of the dive industry. In marine work, the pontoons are going to come in contact with barnacles, sharp, corroded metal, and will be in place, sometimes for hours, and subject to the strong action of currents and ocean swells which cause a great deal of abrasion to the units.

The dump valve on a pontoon has two heavy, brass plates with the layers of the pontoon clamped between the plates. These plates were made particularly heavy so the pontoon could be lifted from the water by the valve without tearing the fabric of the pontoon. Manufacturers should also provide repair kits for patching small holes and abrasions. When no repair kit is available, small holes may be closed by using white or clear silicone cement. The cement should be applied

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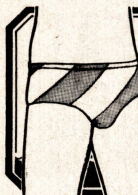
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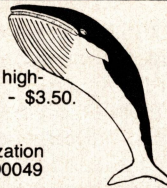
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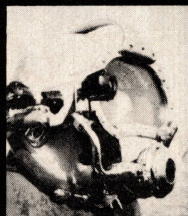
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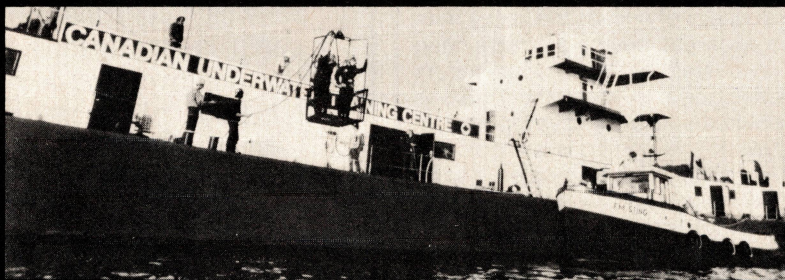
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SCUBA TECH

quite thickly inside the pontoon and, after this coating dries, to the outside. The two layers of cement form a fairly strong patch that adheres quite well to the pontoon.

As with a 55 gallon drum pontoon, it is suggested that chains, the size depends on the weight of the object being lifted, be used for fastening the pontoon to the object. This is particularly important when the pontoon may be in place for several hours while work is completed on the object. Collapsible pontoons are also excellent when used to lighten an underwater load to permit moving across the ocean bottom without the use of top-side crane equipment. By careful rigging and ballasting, a diver can lighten a load of several tons to the point that he can swim it across the ocean bottom, or let it drift with the current if the current is being cooperative.

Collapsible pontoons, or lift bags as some manufacturers call them, are available from Subsalve Industries, Inc., P.O. Box 9287, Providence, RI 02940; J. W. Automarine, Holt, Norfolk, England; and Carter Bag Company, 29500 Green River Gorge Road, Enumclaw, WA 98022. Also, the last catalog received from M & E Marine Supply Co., P.O. Box 601, Camden, NJ, listed several sizes of lift bags.

The YMCA recently announced a course in search and recovery for sport divers. For information write to the National YMCA Center, P.O. Box 1547, Key West, FL 33040, or, if you wish, call (305) 294-5288.

If readers have comments, suggestions, or questions regarding search and recovery of submerged objects, please write to me at SKIN DIVER. Particularly if there are questions regarding this and the previous ScubaTech. Future ScubaTechs will cover all aspects of inspections and reporting techniques for various marine structures such as dams, ships, piers, and offshore oil rigs, to mention just a few. Salvage, be it boats, ships, or their cargo of canned goods or oil, will also be covered. If you have questions or comments regarding any phase of commercial diving write to ScubaTech.

Speaking of salvage, a reader wrote a few months ago requesting information on the treasure ship *Yankee Blade*. The best information I have on this ship is that she was a vessel of 1767 tons and that her homeport was New York. The annual finance report of the Secretary of the Treasury for the fiscal year 1854-55, states that on October 2, 1854, the steamer *Yankee Blade*, enroute from San Francisco to Panama, struck an uncharted rock off Point Conception, and

was a total loss. "An abstract of gold bullion, etc., cleared from the District of San Francisco during the 3rd Quarter of 1854," shows the *Yankee Blade* cleared San Francisco on Sept. 30, 1854, with bullion totalling \$171,000. Of this, \$130,000 was destined for the Atlantic states via Panama, and \$18,000 was for Panama. As far as I know, all is still on the bottom of the ocean. 🐠

FREE DIVING

(Continued from Page 36)

like Al Tillman, Ron Church, Dave Hargraves, Jim Auxier, Chuck Blakeslee — these men weren't snorkelers. Matter of fact, is Jacques-Yves Cousteau a snorkeler when he free dives?

I've enjoyed tank dives; very much, indeed. Used them in Puerto Vallarta, Cozumel, Pennekamp Park, Monterey, Palos Verdes, Mendocino.

And, when I'm not using scuba, sure, I'll stick a snorkel in my mouth. It's easier with, than without. But the use of it doesn't restrict me to floating around with a piece of rubber between my teeth looking down. No. To me the big thrill, now as in the beginning, is flipping my legs in the air and making a surface dive deep into the sea with nothing but a lung full of air.

Besides, I've got my own thing going.

I'm still at the learning stage, and always will be, but I've combined free diving with the art of photography, and believe I've got one of the greatest and most challenging activities going.

I'm 58, and a little past my prime now. But, whenever I feel old and need an ego boost, it's great to take out some of my better U/W slides, admire them again, and reassure myself that I'm still great. After all, no snorkeler could take these kind of pictures bubble butting on top. No, man. You've got to dive — Free dive. 🐠

DIT OSHA CLASS

DIT has scheduled another class for OSHA personnel in November, according to John W. Manlove, president of the Seattle, Washington commercial diving school.

The first class consisted of three weeks of intensive training in diving principles and practice in April. The same students will return to Divers Institute of Technology to finish the final three weeks of training. This course will provide the OSHA inspectors with detailed instruction on the application of the commercial diving standard to actual field operations. Upon successfully completing this course, OSHA students will be qualified to return to their respective offices throughout the United States to perform duties involving compliance inspections under the OSHA commercial diving standard. 🐠

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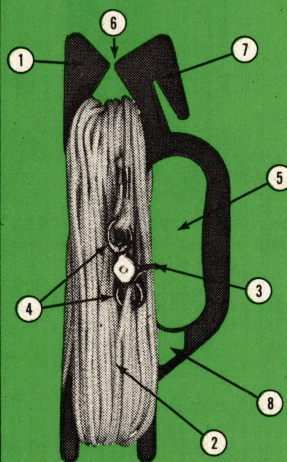
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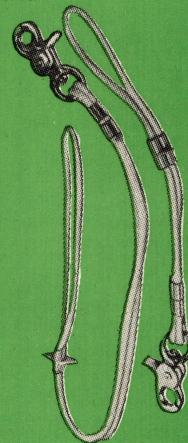
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1717 Rand Rd., Palatine, IL 312/358-3848

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AQUAVENTURE — 1655 Oakton, Des Plaines, IL 297-7414
AQUAVENTURE — Rowhling & Euclid, Arl. Hts, IL 398-5139
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6932 W. 16th St., Berwyn, IL 312/484-1018
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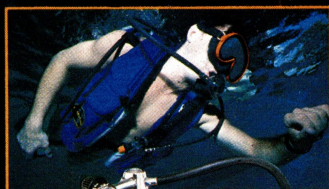
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